ELECTRICAL REVIEW

VOL. CXLI JULY 18, 1947 NO. 3634

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DETROIT

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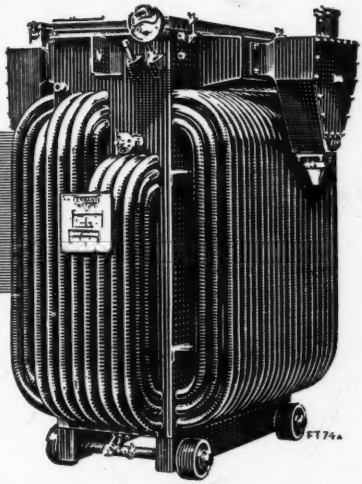

Specify Ferranti

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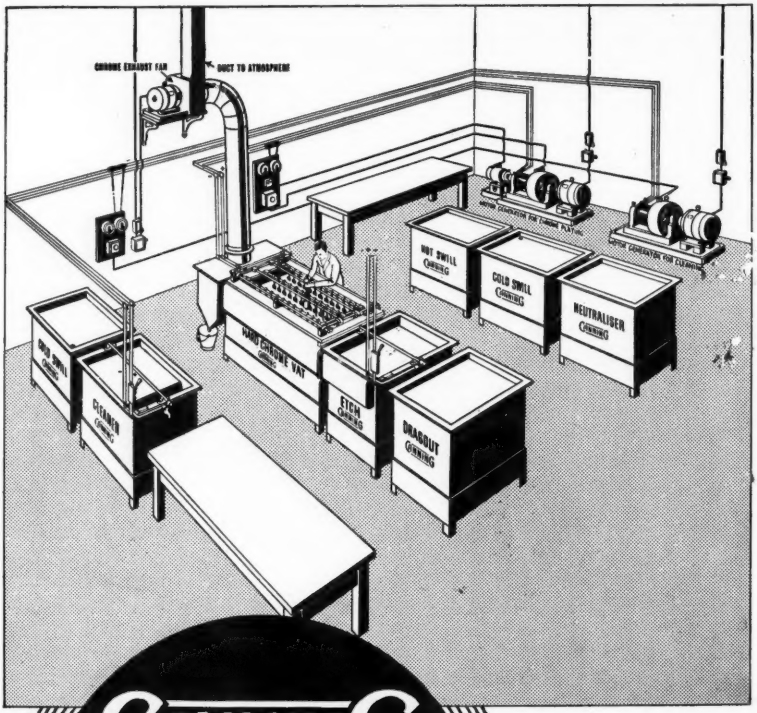

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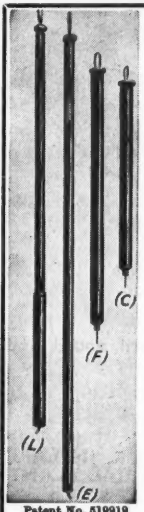

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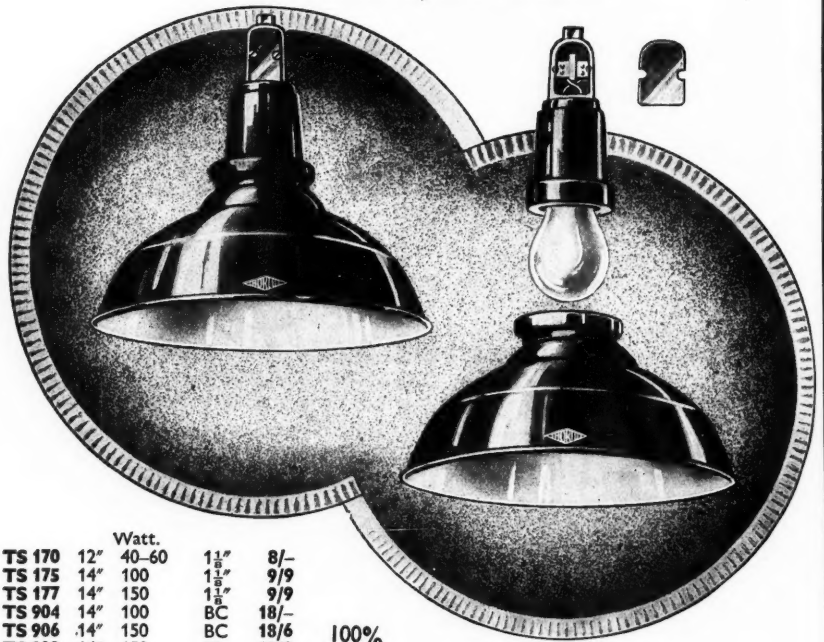

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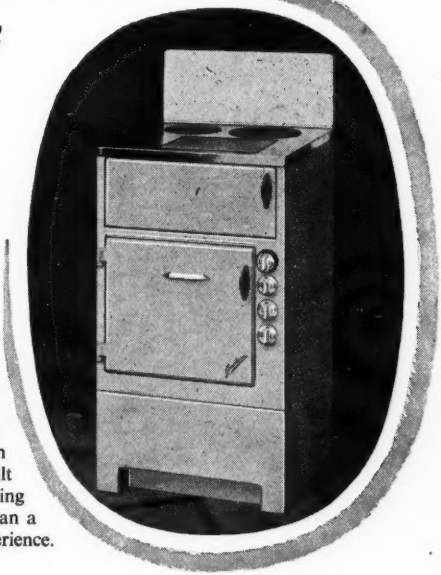
ELECTRIC COOKING CABINET



Essentially modern in appearance and equally up to date in design. A worthy successor to the well-known 93J model; retaining those features for which that Cooker was justly famed; and embodying the latest improvements in materials and construction. Simple to control, efficient in operation and economical in service. Built by engineers for the discerning buyer, and backed by more than a quarter of a century of experience. Note these features :—

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3. Ample Hotcupboard space.
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8. Simmering device and Backer-Jackson radiant type boiling plates fitted if desired.

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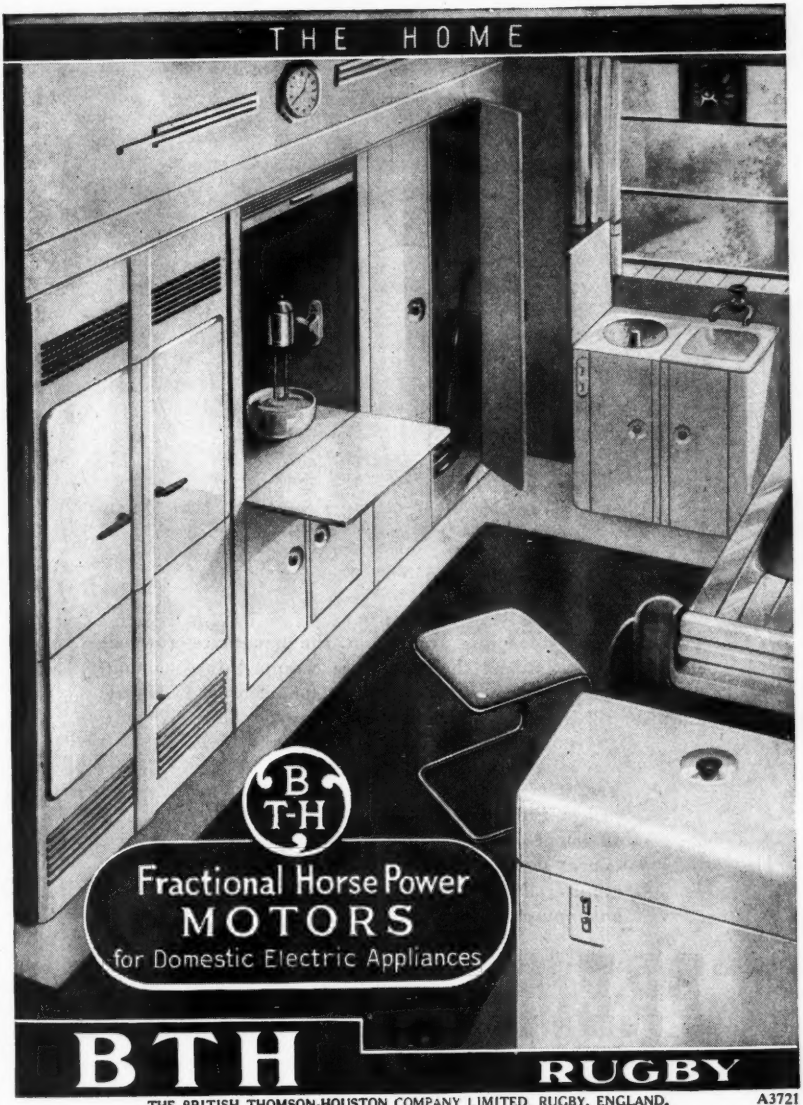
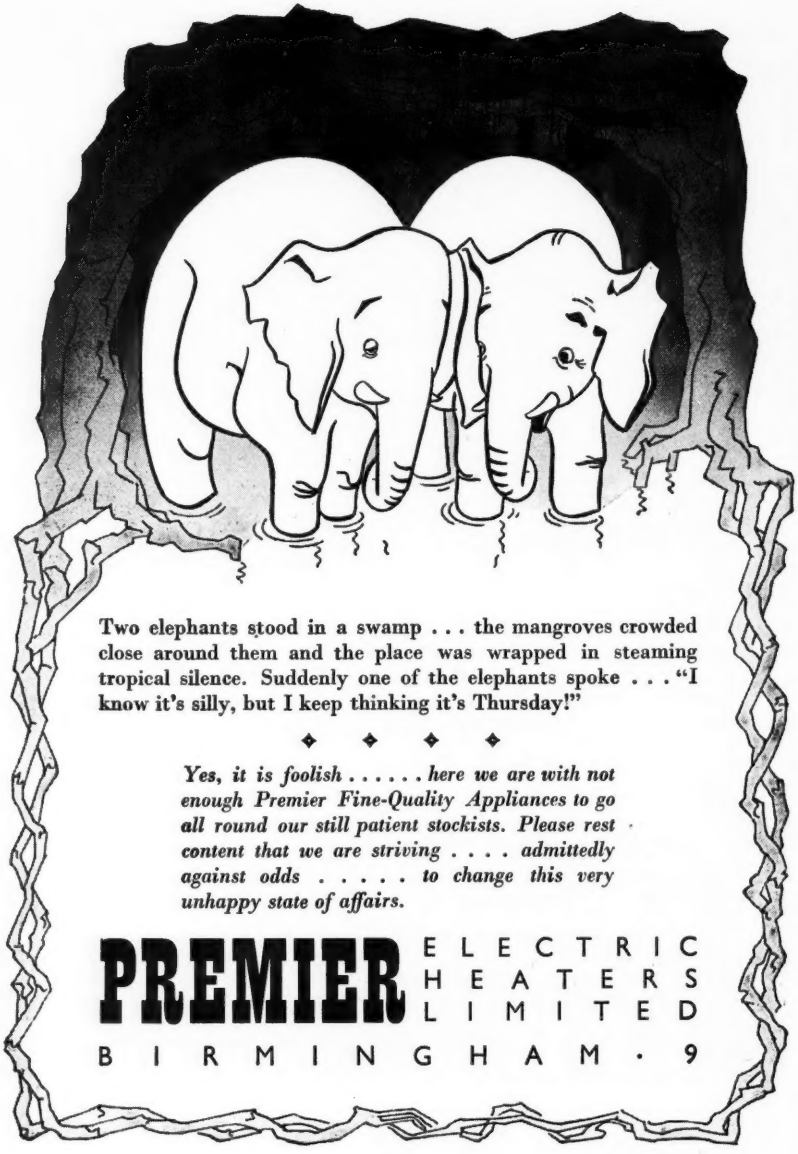


THE BRITISH THOMSON-HOUSTON COMPANY LIMITED, RUGBY, ENGLAND. A3721



Two elephants stood in a swamp . . . the mangroves crowded close around them and the place was wrapped in steaming tropical silence. Suddenly one of the elephants spoke . . . "I know it's silly, but I keep thinking it's Thursday!"

◆ ◆ ◆ ◆

Yes, it is foolish . . . . . here we are with not enough Premier Fine-Quality Appliances to go all round our still patient stockists. Please rest content that we are striving . . . . admittedly against odds . . . . . to change this very unhappy state of affairs.

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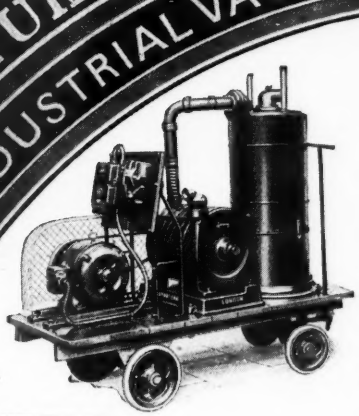

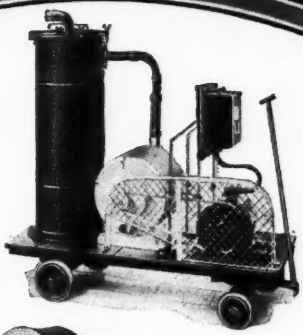

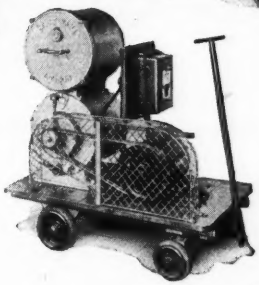

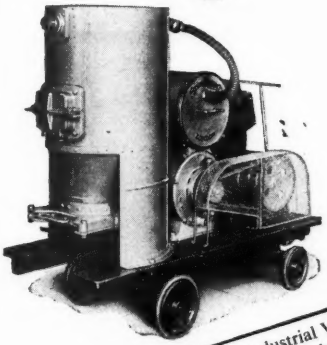

THE extensive range of Sturtevant Industrial Vacuum Cleaners includes machines specially built for applications where heavy cleaning capacity and substantial construction are the main essentials. Large numbers of machines are successfully operating in all kinds of factories in all parts of the world and, like other Sturtevant Cleaners, they give continuous service and maintain the highest efficiency under the most exacting conditions. Wherever there is dust and dirt there is a need for a Sturtevant Cleaner for, whatever the nature of the dust and the conditions, **experience shows that the systematic and regular use of a Sturtevant Cleaner overcomes dust problems, effects a reduction in maintenance costs, and increases the efficiency of all cleaning operations.**

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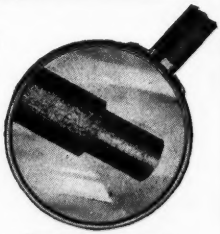

Micro Photo of hair actually turned on a Pultra Lathe.

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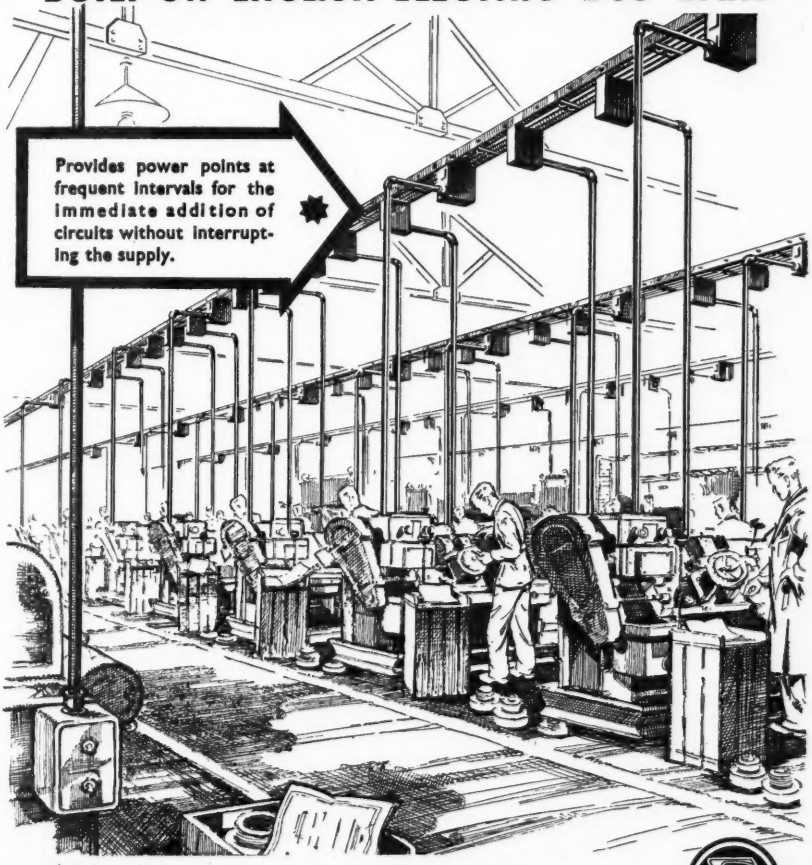

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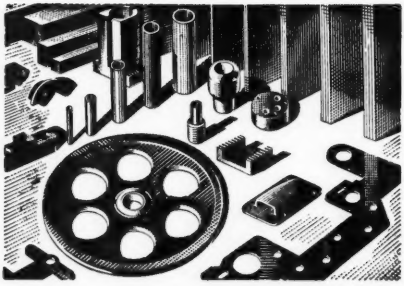

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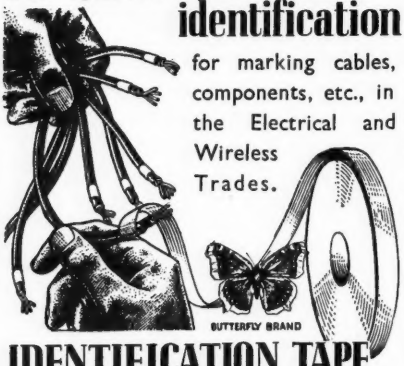

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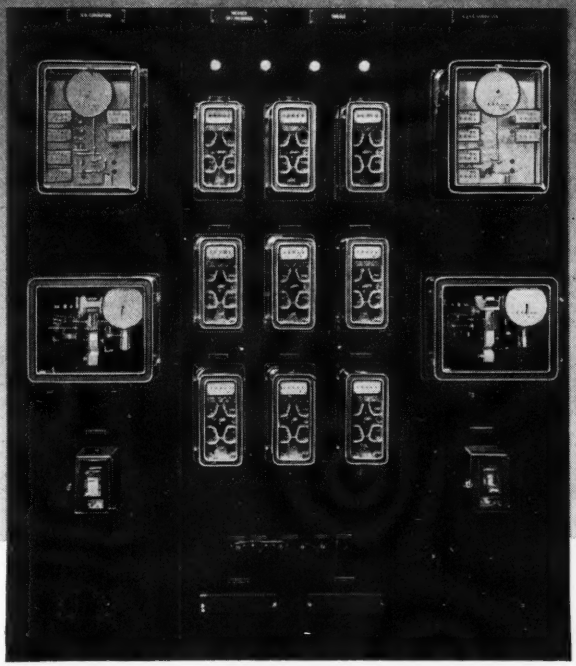

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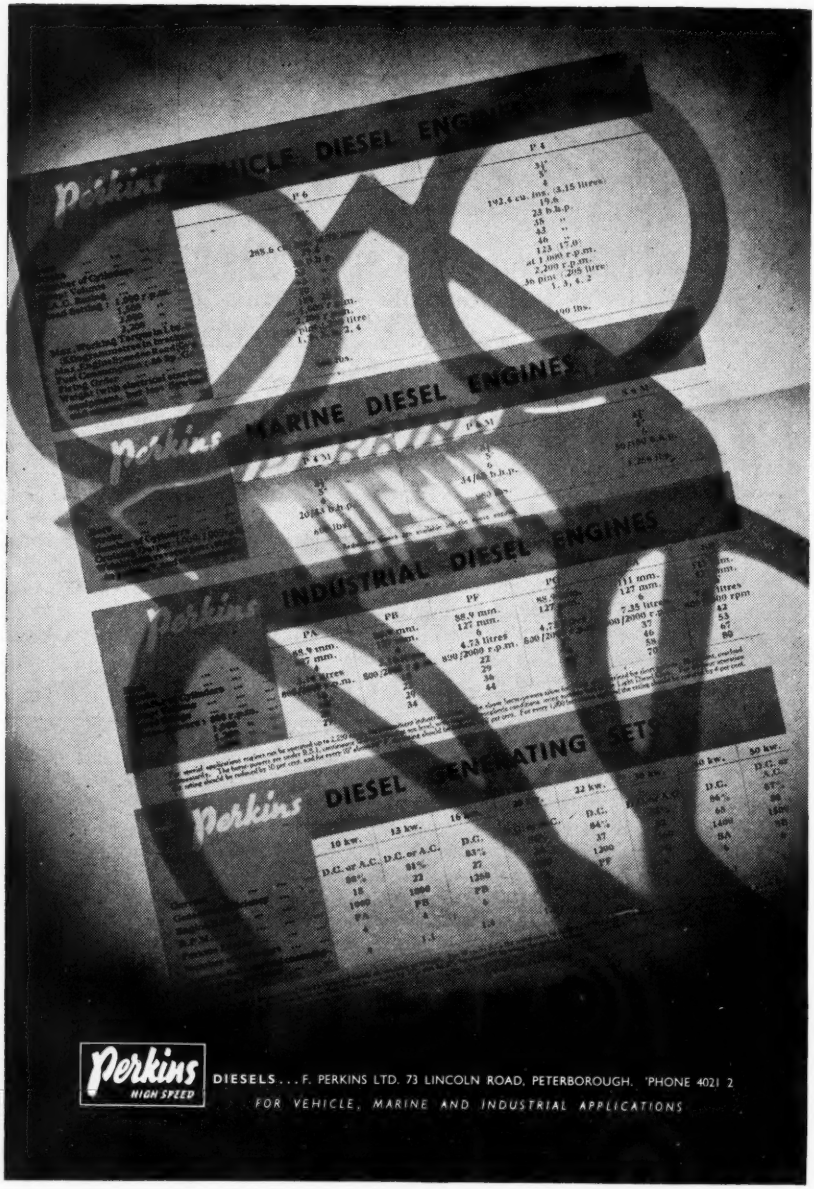
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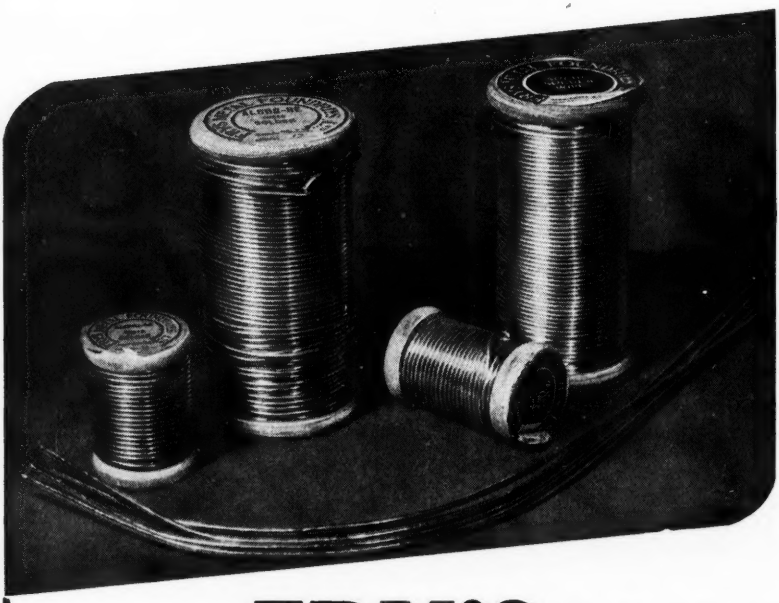

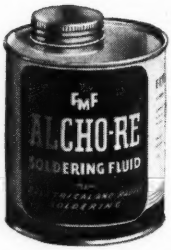

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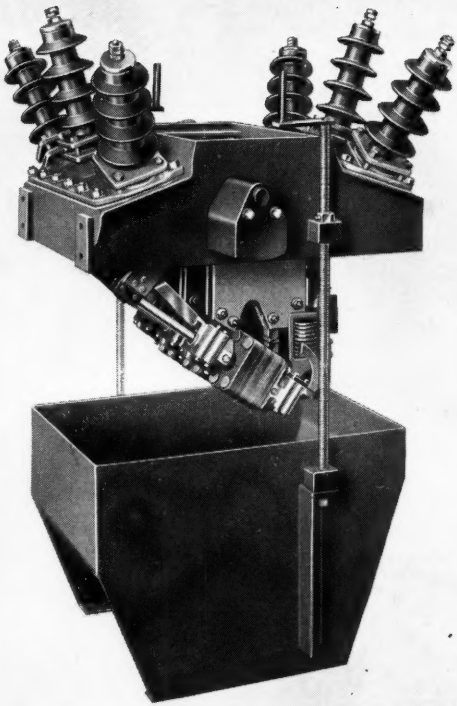
With side-blast arc control device giving rapid clearance of faults, longer operating periods without maintenance, lighter construction and reduced oil quantity



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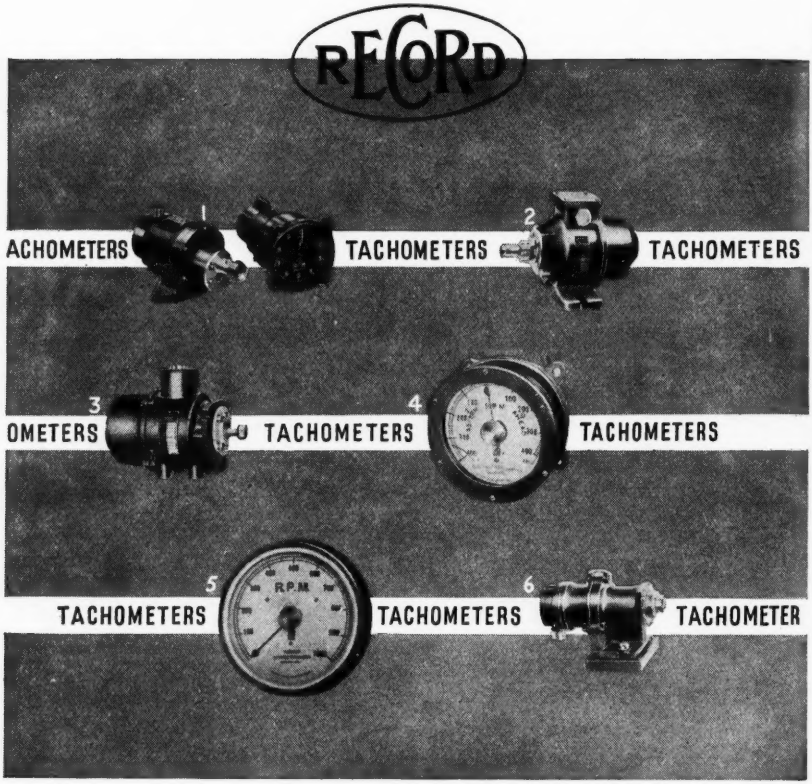

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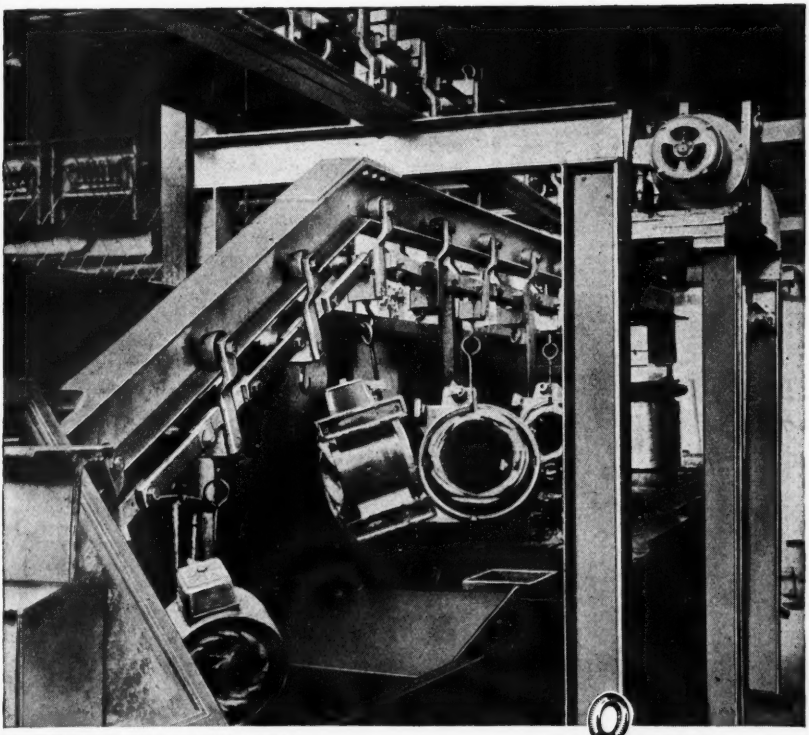
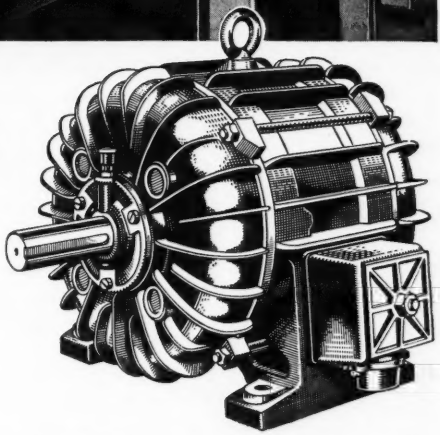


Final Impregnation of Wound Stators before baking.



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Impregnation, varnishing, baking and final finishing of A.C. Motor windings are all produced on a continuous conveyor system, giving a high production rate, yet incorporating a thorough electrical treatment, giving an output of one motor every minute of the working day.

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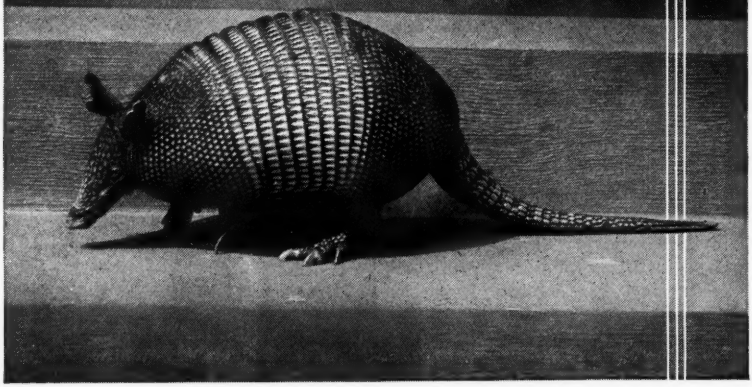

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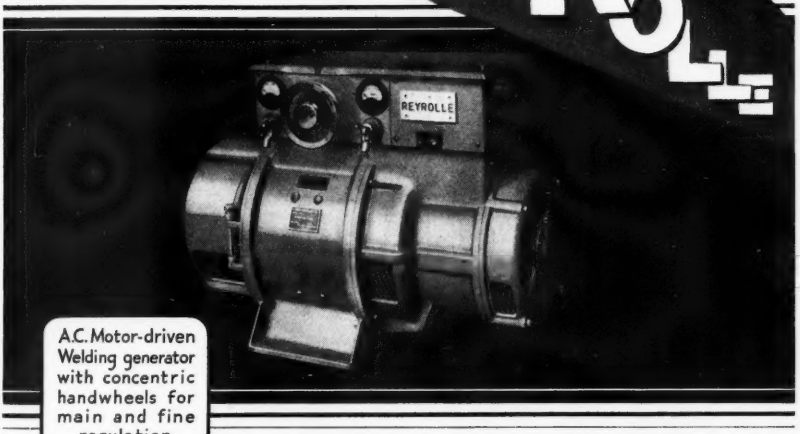

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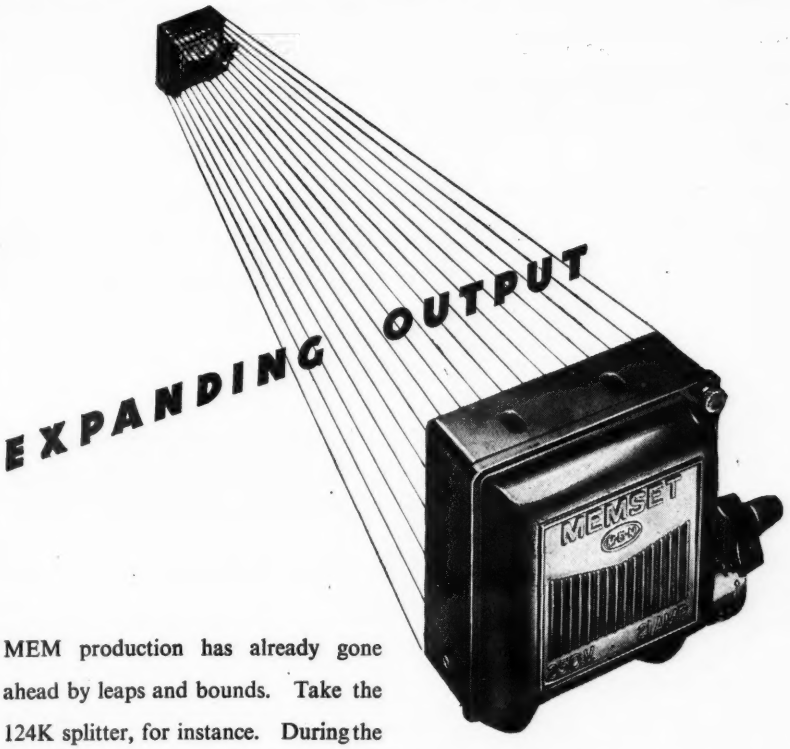

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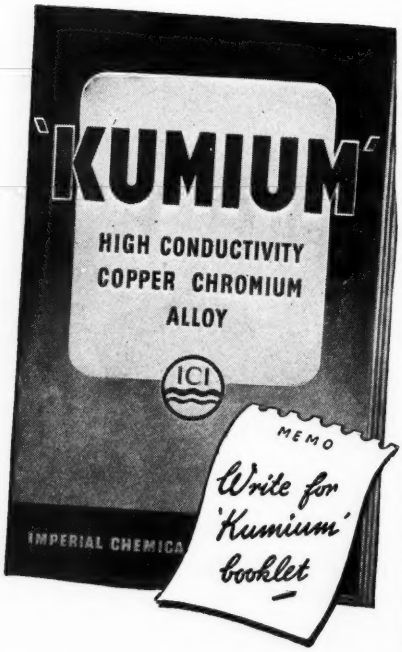

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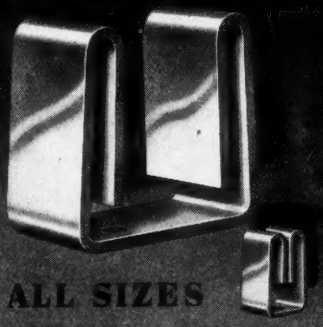

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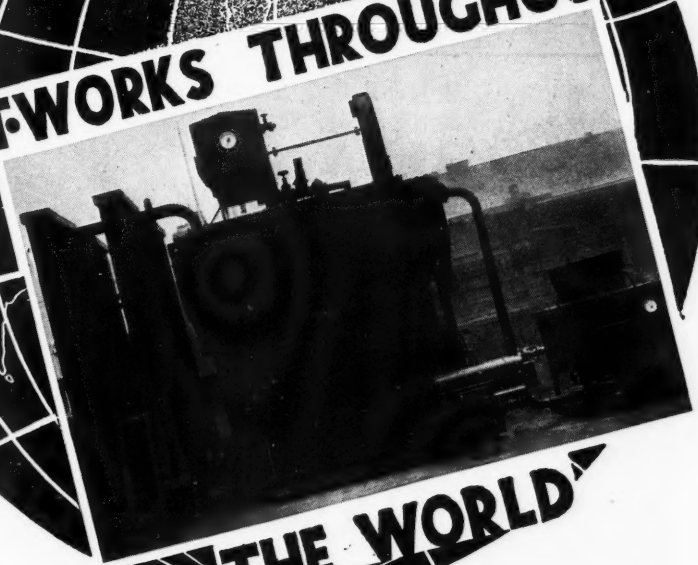

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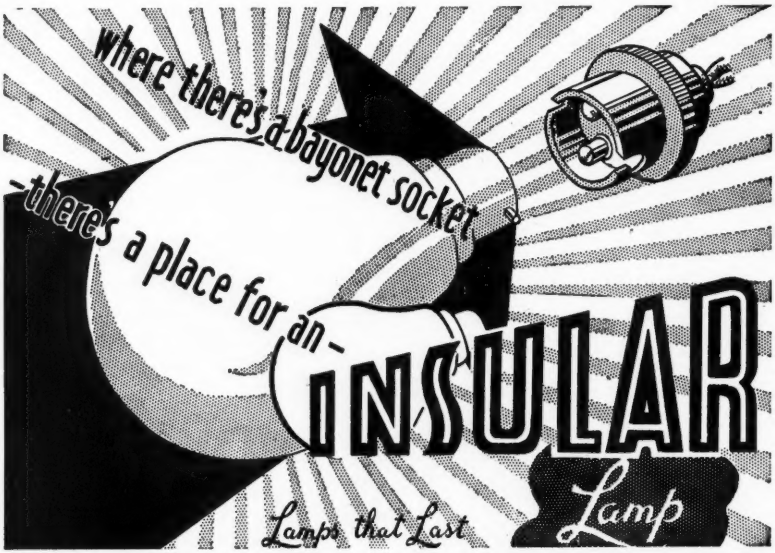

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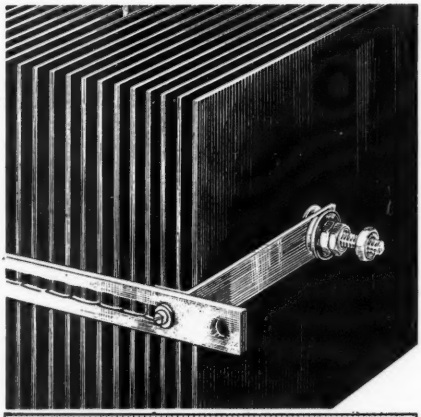

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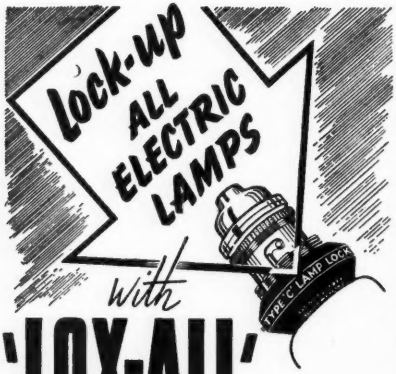

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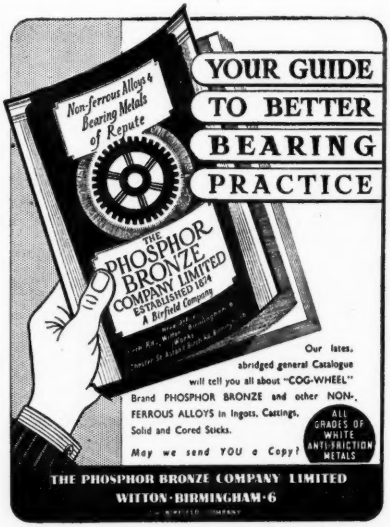
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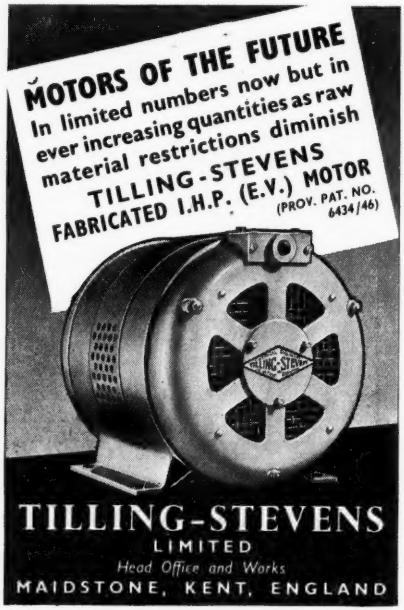
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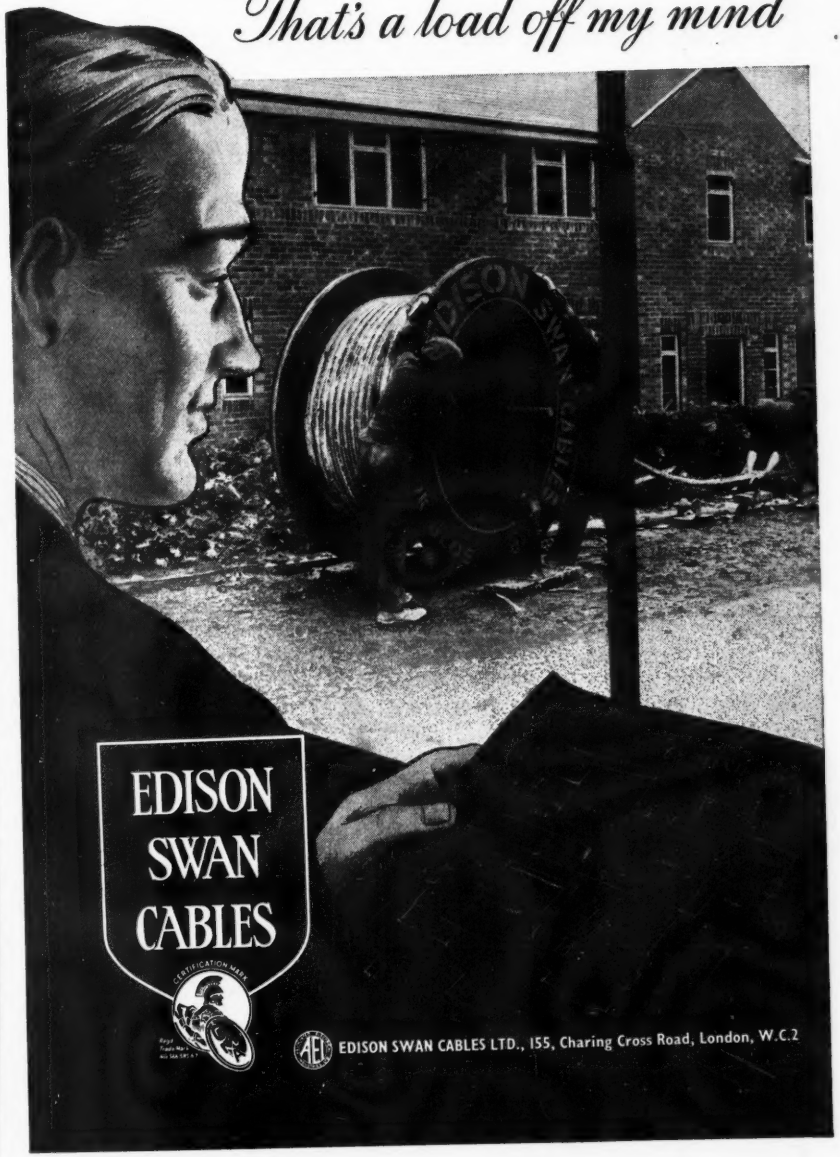

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A COMPLETE RANGE NOW AVAILABLE TO MEET ALL REQUIREMENTS

★ See table below giving main physical characteristics of the types of BIMETAL in production.

TYPE	COMPOSITION		Deflection Constant* per °C. (d)	Resistivity microhms/cm. cube at 20 °C.	Maximum Working Tem. °C.
	Low Expansion % Ni	High Expansion % Ni			
BIMETAL 140	38	20	14.0 x 10^{-6}	75	300
BIMETAL 160	36	20	15.6 x „	78	250
BIMETAL 400	42	20	11.0 x „	70	400
BIMETAL 15	36	100	9.7 x „	15	200

* The deflection constant (d) is defined as the deflection of a strip of unit length and unit thickness for each °C. rise in temperature over the linear part of the deflection curve.

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Permutit "Deminrolit" Process cuts cost as much as 95%

ANALYSES OF WATER BEFORE AND AFTER TREATMENT BY PERMUTIT 'DEMINROLIT' PLANTS IN COMMERCIAL USE.

(Note - All figures in parts per 100,000.)

Plant	No. 1		No. 2		No. 3	
Water	Crude	Treated	Crude	Treated	Crude	Treated
Cations						
Calcium Ca	3.2	-	9.4	-	10.7	-
Magnesium Mg	0.8	-	0.36	-	1.09	-
Sodium Na	0.46	0.23	1.0	0.31	1.66	0.44
Total	4.46	0.23	10.76	0.31	13.45	0.44
Anions						
Carbonate CO_3	4.2	0.24	12.4	0.29	10.5	0.57
Chloride Cl	1.8	0.06	2.5	0.12	2.84	0.30
Sulphate SO_4	1.35	-	3.48	0.03	11.95	-
Nitrate NO_3	-	-	-	-	1.15	-
Total	7.35	0.30	18.38	0.44	26.44	0.87
Total ions in solution	11.81	0.53	29.14	0.75	39.89	1.31
COST per 1000 gallons	5.22d		9.83d		16.5d	

The table shows the composition of some types of water before and after treatment by Permutit's "Deminrolit" Process. Water similar to a distillate is produced by this process at a fraction of the cost. Where distilled water was too expensive you can afford "Deminrolit" water. The process has been in practical use in Great Britain for over 7 years. Write for technical publication "Distilled Water without Distillation" to

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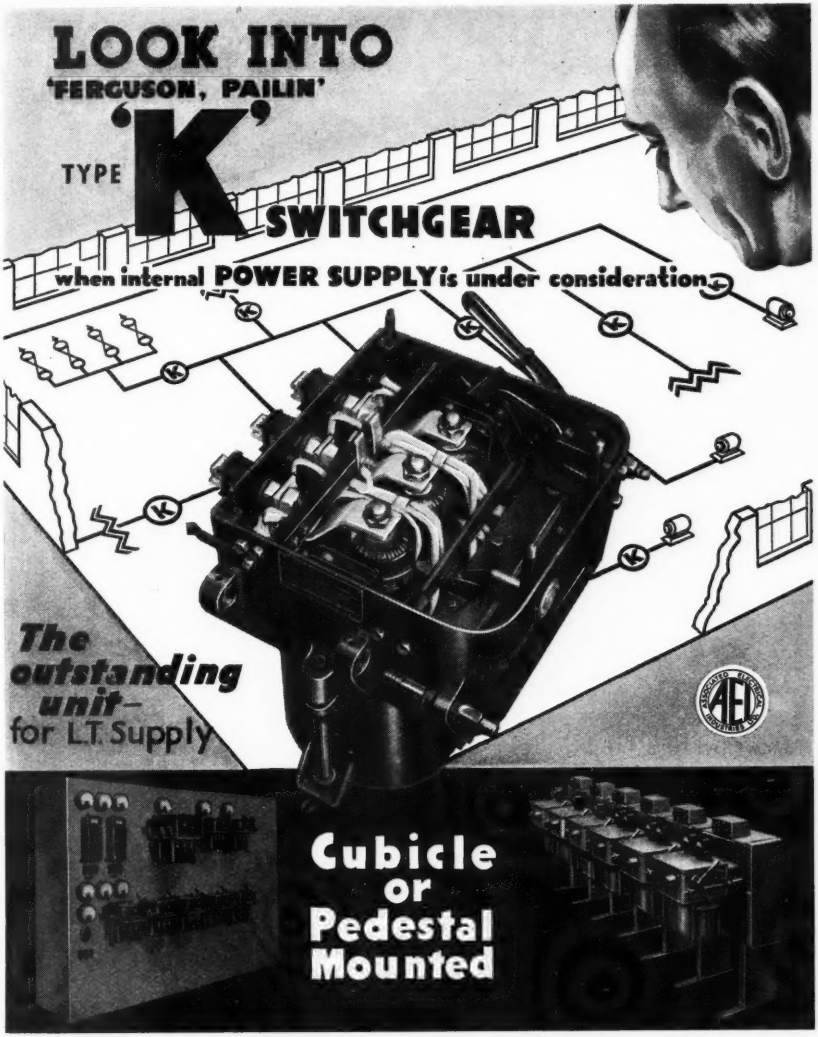

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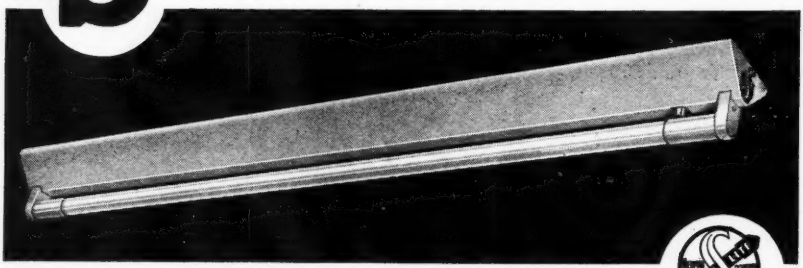

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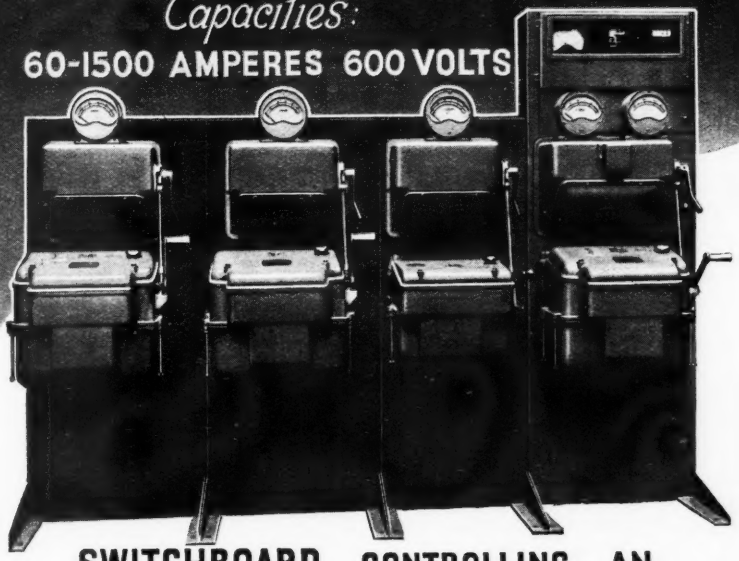

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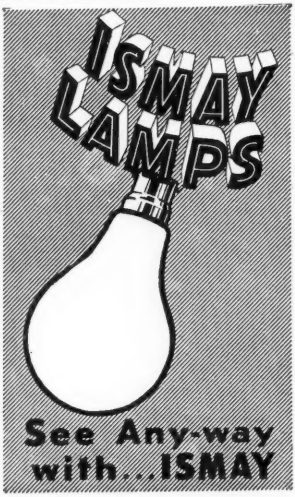

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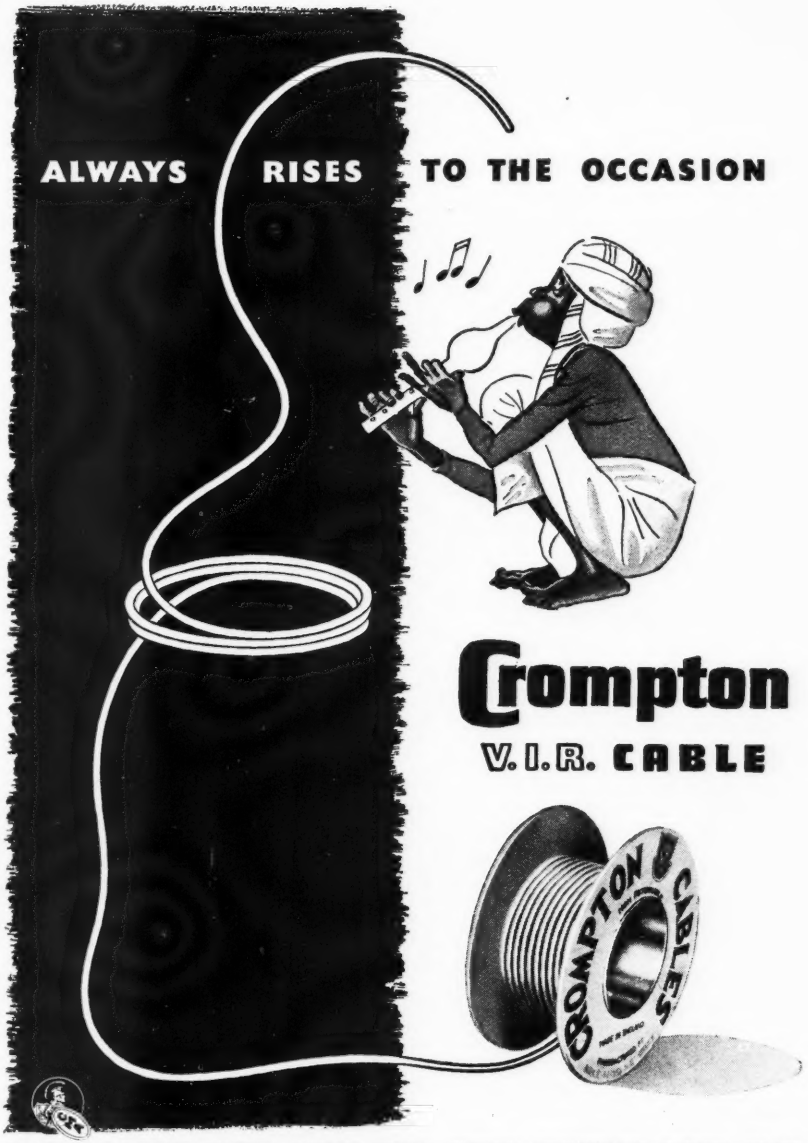

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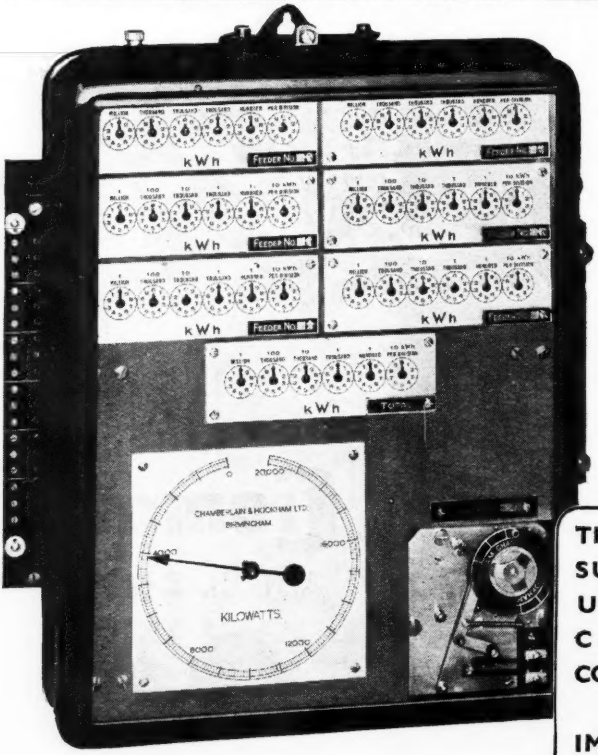

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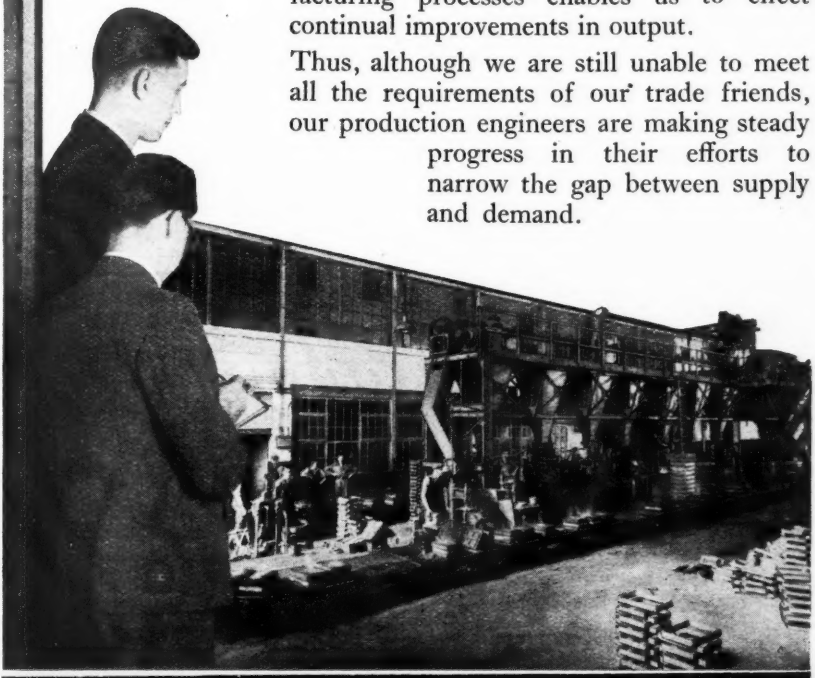

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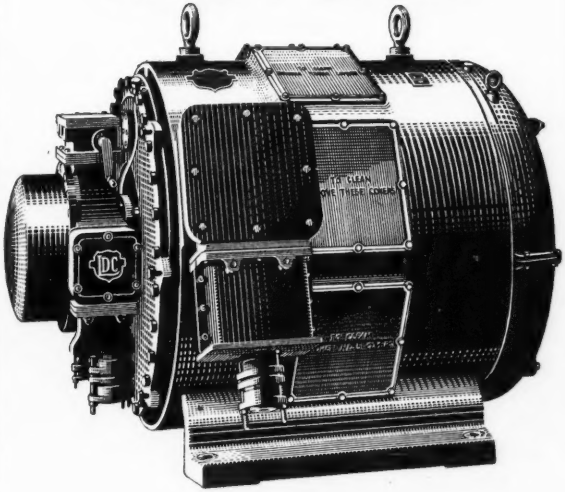

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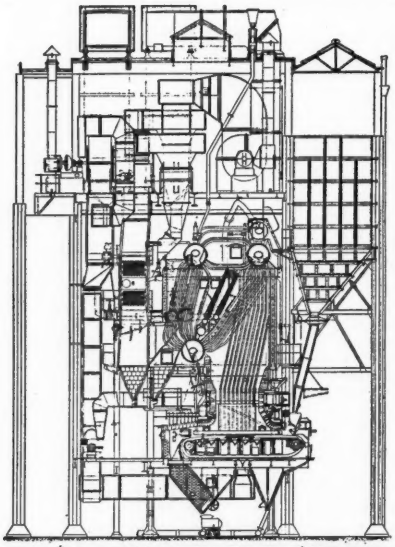

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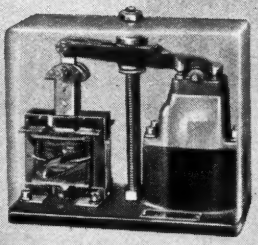

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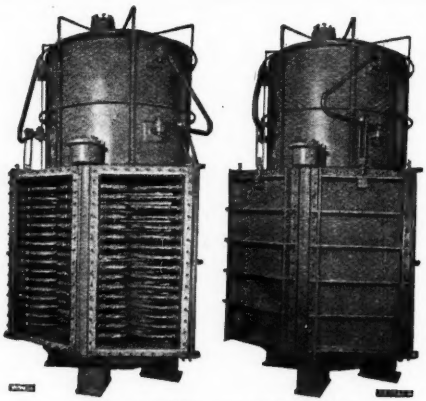

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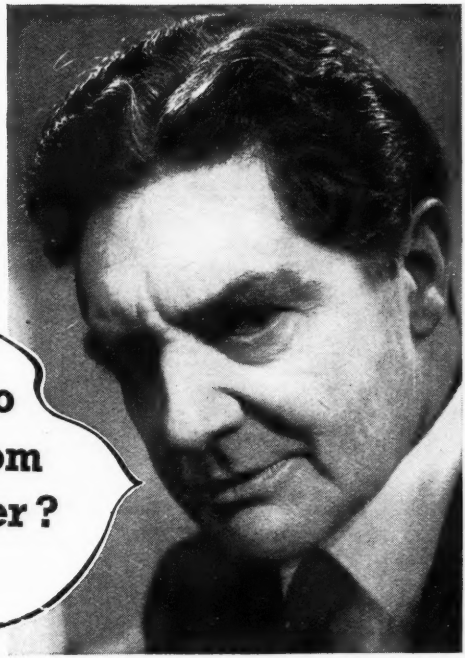

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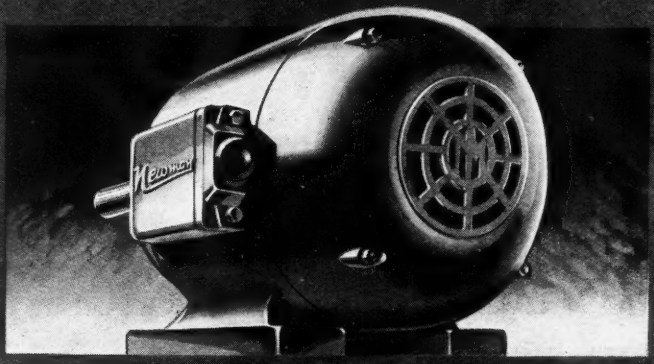

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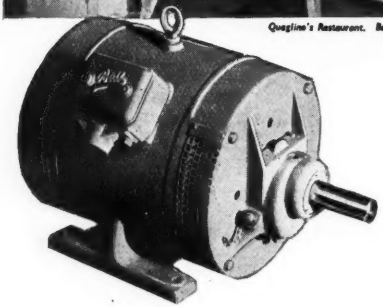

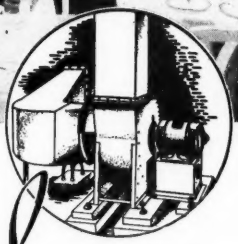

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ELECTRICAL REVIEW

July 18, 1947

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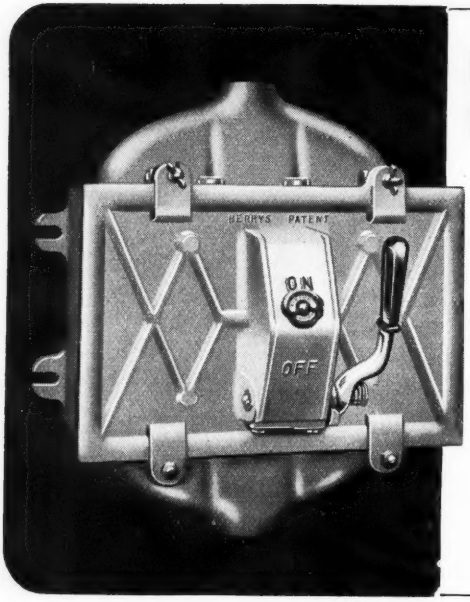

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLI. No. 3634 JULY 18, 1947 9d. WEEKLY

Contractors' Future

How Will They Fit In?

IN his address at the annual meeting of the Electrical Contractors' Association the president (Mr. Hamlyn Drake) said that their organization had been strengthened during the year and membership had reached over 2,000. He stressed the good service which the members rendered to the public, the latest aspect of which was the guarantee-of-work scheme introduced during the year. (A similar scheme has been adopted by the National Register of Electrical Installation Contractors.) This, Mr. Drake said, was an alternative to compulsory registration which, the Association was convinced, was the only way of achieving protection for the public.

"Probationary" Membership

Another move towards this end was the institution of a new grade of membership ("Class III") which will enable new entrants to the electrical contracting industry from the Services and from other industries to serve a sort of probation while "achieving a reasonable degree of business ability."

Still with the safety of the public in mind, the Association has protested against the flood of shoddy and dangerous electrical appliances which are to be seen in the shops. It has suggested that the use of valuable raw materials for this purpose should be stopped, but apparently the suggestion has not been favourably received.

Mr. Drake dealt at some length with the terms of the Electricity Bill and their implications. He was mainly concerned with the probable effects of the manufacturing and retailing powers which are to be given to the proposed authorities. Strong (and successful) endeavours have been made by the Association in the last year or two to make its members "retail minded" and so it is naturally anxious that any competition from the electricity authorities should be fair. Mr. Shinwell appears to sympathize with this view but amendments to the Bill moved in committee to ensure fair trading were not accepted.

Installation Work

But the main business of electrical contractors is still installation work and here Mr. Drake was apparently unable to forecast the probable trend of things. In the past there has been a considerable amount of competition in installation work from electricity supply authorities. But not all these authorities have used their powers under the 1926 Act and a great many of them have co-operated with the local contractors in electrical development. In fact the contractors have always regarded themselves in some degree as agents of the supply authorities and that position has been widely accepted.

The business of an electricity supply authority is first to produce (or obtain) a supply of electricity at the lowest possible cost and see that it is efficiently distributed and maintained. But it must necessarily make sure that anybody who wants a supply shall have it and shall also have an adequate and properly carried out installation for its use. Generally speaking,

the electrical contractors have looked after this second requirement in the past and there is no reason why they should not continue to do so.

It is evident, however, that there is likely to be a close scrutiny of their activity (or lack of it) by the new Area Boards when they get going. What will happen then will depend largely upon the ideas of the men composing the Boards or, maybe, a general policy will be laid down by the Central Authority. The Boards will possess clear and complete powers to carry out installation work and will enjoy considerable advantages as compared with individual electrical contractors if they decide to use them.

Mr. Shinwell has publicly expressed a desire that there shall be co-operation between the Boards and the electrical contractors. It is incumbent upon the latter (and their livelihood depends on it) to demonstrate clearly their capability and willingness to continue to give the public the best and most complete installation service, leaving the Boards to concentrate on the supply and distribution of electricity.

Practice and Theory

ESSENTIAL as profound academic knowledge is to a real understanding of the potentialities of a rapidly expanding science, the electrical engineer is, nevertheless, primarily one who can apply that knowledge most efficiently. This makes the latest report issued by the Institution of Electrical Engineers (reviewed on page 91 of this issue), which deals with practical training, at least as important as its predecessors. The most desirable qualities required in one who aspires to be a professional electrical engineer are given as personality, general intelligence and scientific knowledge. The order of the words is presumably not a chance one, as it implies ability to make the best use of the accumulated experience of others and accounts for the importance attached to the organization by the apprentices themselves of social, athletic and educational activities.

Professional Engineers

DETAILS of the great need there is for young professional engineers will become available when the projected survey has been completed by the Ministry of Labour and National Service. The demand is known to be unprecedented, and that by itself would justify the promotion of craftsmen apprentices in the manner proposed. Success of an apprenticeship scheme largely depends upon the vesting of responsibility for its proper working in one man of the requisite qualifications and status. Co-ordination of this aspect of training with that given in universities and technical colleges is more complex, but students are recommended to make full use of the I.E.E. Advisory Service. A further requisite is the full co-operation of all manufacturing concerns able to train a number of apprentices.

Realistic Outlook

THE suggestion that one year's practical training should precede a university course has much to recommend it, as it would tend to encourage the adoption of the right outlook as well as to relieve the present congestion in educational establishments. Arising out of the Committee's representations, it is most satisfactory to learn that neither of the two training periods proposed in the Report will be interrupted by obligation to serve in the armed forces. That will come at the end, when experience which has been gained in a technical unit will be an addition to that obtained in the ordinary way.

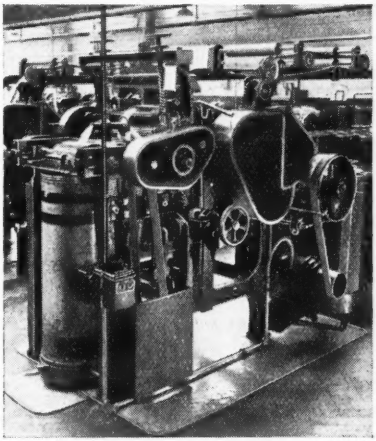
Double Day-Shifts

As we have reported, the engineering industry has agreed upon the principle of shift working as a means of spreading the electrical load. It is hoped that other industries will be able to arrange to do the same. One difficulty is the existence of the Women and Young Persons Act, 1936, which limits working hours except in special instances sanctioned by the Minister of Labour. This is likely to make shift working impossible where an appreciable proportion of workers in a factory are women or lads. A Ministry of Labour Committee which has studied the subject recommends that the system of authorization by the Minister should be continued but, although still generally prohibited, there should be latitude (for not more than two years) in the matter of employing young persons under eighteen years of age. The workpeople should be given an opportunity of voting for or against in each case and it is recommended that the hours should fall between 7 a.m. and 11 p.m.

Wool Textile Industry

New Reasons for Encouraging Electric Drive

SEVERAL days spent at Bradford visiting wool textile manufacturers have convinced us that the increased use of electricity, particularly from the public supply, is not only essential if the industry is to prosper but would also make a substantial contribution towards husbanding the country's coal resources. One might have thought that the electricity crisis in February would have discouraged mill owners who were contemplating conversion to the public electricity supply, but actually the reverse is the case. Apparently they feel that the prospects of getting electricity from the Electricity Department are much more promising than the maintenance of their already-inadequate coal supplies.



Single-head intersecting gill box fitted with a ½-h.p. motor

The considerable interest shown immediately after the war in employing electricity to make mills more efficient and the surroundings more congenial has in fact been greatly accelerated by the crisis, and several of the firms who were approached last year to discover the possible future requirements of the network and who at the time did not contemplate any alterations of their arrangements have since made pressing appeals for supplies.

Before the war the change-over from steam plant to public electricity supply though not spectacular was proceeding steadily, and between 1935 and 1939 eight textile factories with steam plant totalling over 2,000 h.p. were converted. During the war very little development took place owing to the concentration of the industry, but since the cessation of hostilities a great amount of interest has been shown. Since the war seven more mills have been connected with an approximate load of 900 h.p. and there are now about eleven mills (8,200 h.p.) urgently demanding supplies, with several more seriously considering conversion.

Apart from the exceptional fuel conditions which prevail to-day there are innumerable other arguments in favour of public electricity supplies. Present-day coal costs are approximately two to three times their pre-war figure, whereas electricity charges have only risen slightly in comparison. The high cost of coal, and its varying quality, coupled with difficulties of labour and transport, have put electric drive, with electricity purchased from a public supply authority, in a much more favourable position, and it is usually possible to show a substantial saving in running costs when converting to electric drive.

Furthermore, many of the items in private generation costing are frequently underestimated, or not considered, particularly in relation to supervision, interest and depreciation, insurance, rent, rates, taxes, water, oil, maintenance costs, and the disposal of ash.

The susceptibility of private plant to breakdown and the resultant loss of production are also not taken sufficiently into account. Though private plants may give a very long period of reliable service they do not last for ever and many of them in use to-day have reached or are reaching the age at which faults must inevitably occur. When they do, the owners may be faced with a lengthy shut-down. Spare parts for old-fashioned plant are not easy to come by and many of the makers have long since gone out of business: the provision of duplicate plant is a costly precaution. In some instances, even in these days of electrical plant shortage, it has been possible for the manufacturers concerned to obtain a public

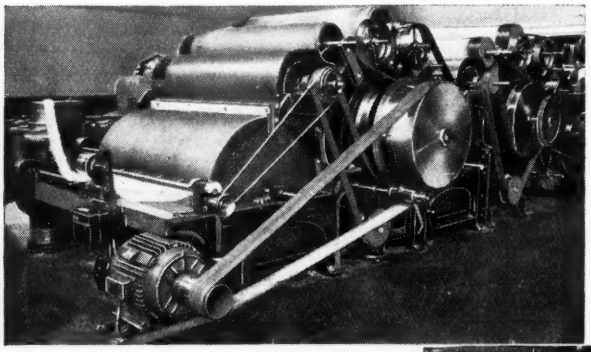
electricity supply in a shorter time than it would have taken to get private plant repaired.

One further disadvantage of private generation is that it is often necessary to install an engine of much larger capacity than initial requirements justify in order to provide for future developments. Obviously this plant in its early life operates on uneconomical loads. In any case, mill owners have not unlimited resources available for improving their manufacturing facilities so that surely any funds available could be employed to better advantage on purchasing modern textile machinery than the acquisition of new or the maintenance of existing power plants.

While the generating capacity available is not such as to favour wholesale conversions at the present moment, the main limiting factor is the supply of electric motors, delivery of which is now generally quoted as over twelve months.

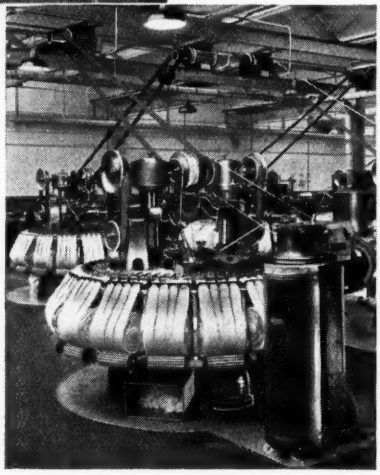
From the point of view of fuel saving there can be no doubt as to where the country's interests lie. Mr. T. H. Carr, the Bradford city electrical engineer and manager, who is chairman of the E.D.A. Woollen Industry Sub-Committee, estimates that a change-over to public supply of the 56,000 h.p. of steam plant remaining in the 110 mills still unconverted in his area about 120 million kWh would be required annually and that the saving of coal would approach 80,000 tons a year. For the conversion of all the steam engine plants in the Mid East England area (200,000 h.p.) 360,000 tons of coal could be saved.

No matter whether electricity is purchased or generated on the premises the fact remains as emphasized by the recently published report of the Working Party for the Wool Textile Industry, that the extension of the use of electricity is implicit in the future well-being of the industry. Increased production per man-hour, so greatly needed to-day, is impossible without introducing more mechanization, and mechanization means electricity.



A 7-h.p., 480-r.p.m. totally enclosed motor drives this worsted carding machine

Shortage of manpower is still the factor most restricting expansion of the industry and it is to electricity that we must look to provide many of the improvements in working conditions that will encourage former workers to return to, and new workers to enter, the industry. The adoption of electric drive, particularly individual drive, by the elimination of belting and shafting, provides a more spacious appearance to the surroundings and permits a comprehensive scheme of uninterrupted lighting and attractive decoration to be carried out. The



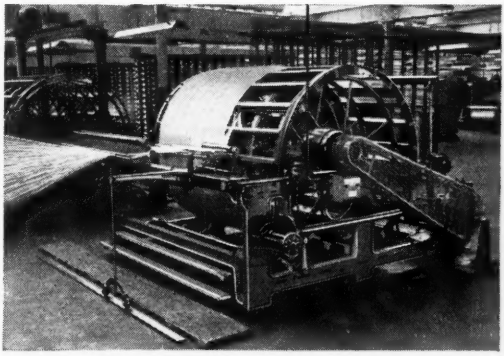
Individually driven noble combs

availability of electricity in the mills also permits of the provision of a number of facilities which give improved welfare conditions, such as better ventilation or even air conditioning, electric hand drying (which helps to prevent industrial diseases), better cooking arrangements and electro-medical treatment.

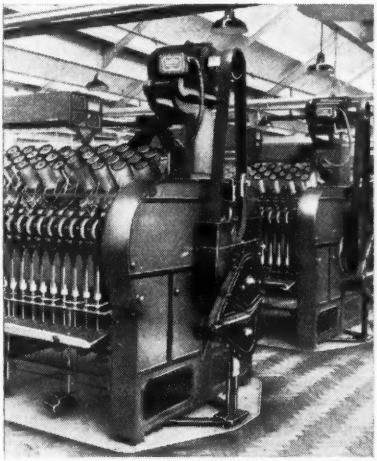
The high quality of their products has always been a feature of which British manufacturers have been justifiably proud and it is on the strength of the indisputably better results possible that many mills are adopting electrical methods. A constant drive is essential in both the spinning and weaving processes, any variation in speed being reflected in unevenness of the finished product.

Electric drive is entirely free from the cyclical speed variation which is present and cannot be entirely eliminated when using a reciprocating steam engine. These cyclical variations, which are magnified both by mechanical transmission systems and by the periodical operation of such plant as looms, can assume very considerable proportions. In fact there have been instances when it has been difficult to operate looms satisfactorily at points remote from the drive because of this effect.

The freedom of electric drive from cyclical variation further makes practicable an appreciable speeding up of operations, it being possible to run machinery constantly at speeds much closer to the optimum to secure maximum production. The speed of stopping and starting of spinning frames and looms also has an important effect on the finished products. It is generally accepted that a spinning frame should be started smoothly and brought up to speed in about 3 seconds, whereas a loom must be brought up to speed very quickly (in approximately one quarter of a revolution of the loom crank shaft) in order that the first pick is put in at the right speed.



Warping machine with 2-h.p. motor



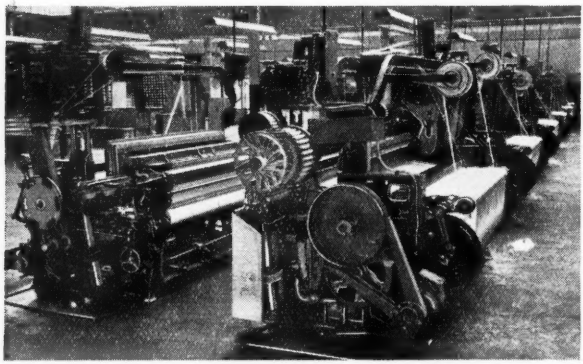
These 200-spindle worsted cap spinning frames are individually driven by 9-h.p. totally enclosed motors

While spinning machines can be successfully driven by a group drive and started up and stopped through fast and loose pulleys, individual drive has much to recommend it. With a "solidly" coupled individual motor the acceleration of the frame is out of the hands of the operatives, the starting characteristics of the motor being designed to suit any type of machine.

In the case of looms the fast and loose pulley system of starting and stopping cannot be said to be entirely satisfactory, for though operatives are highly skilful at starting their belt-driven machines the fact remains that faulty operation can and does occur. Individual electric drive of each loom provides a highly successful method of overcoming the difficulty. In this case two almost equally effective means of starting are available. Either a clutch can be used in

conjunction with a standard induction motor or a specially designed high-starting-torque loom motor can be directly coupled to the loom shaft so that the motor starts and stops with the loom.

This question of improved control is, however, only one of the factors that is bringing about the gradual adoption of individual electric drive at all stages of production. It is often desirable to run only part of the plant: with an individual or small group drive this is simple and economical running conditions can be maintained. As previously mentioned, a motor can be matched to the machine it is to drive and the individual units, apart from being more adaptable to automatic operation, are less liable to a complete shut-down.



Individual drive is particularly applicable to Northrop automatic looms. Note the fluorescent lighting which is now being largely adopted throughout the textile industry

The elimination of line shafting too, besides saving a considerable amount of valuable space, removing a potential source of danger, and letting in the daylight, also both simplifies layout and avoids power wastage. Transmission losses in long lines of shafting, bevel gears, etc., are usually between 20 and 30 per cent, and in some of the worst cases may actually be as high as 50 per cent. Furthermore, defects in machinery tending to increase the power input, often pass unnoticed owing to the difficulty in measuring the power taken by individual machines. Yet another advantage of eliminating overhead shafting particularly applicable to this industry is the avoidance of damage to materials caused by oil and dirt falling upon them.

It is, of course, impossible to lay down hard and fast rules for the most advantageous ways of converting individual mills to electricity, but generally the simple substitution of a single motor for a steam engine, though probably the cheapest method, is to be deprecated, since all the disadvantages of the mechanical power transmission system remain. Sectional group drive, however, has a good deal to be said for it, especially for banks of spinning machines. It provides a reasonable amount of flexibility, much of the power transmission system is cut out and the conversion is easily effected. Nevertheless individual drive is being stipulated in most of the latest conversions and in new mills and the day must surely come when every machine will have its own electric motor.

We are much indebted to Mr. Carr and to his assistant consumers' engineer, Mr. A. J. Francis, for their help in providing material for this article.

Textile Mill Lighting

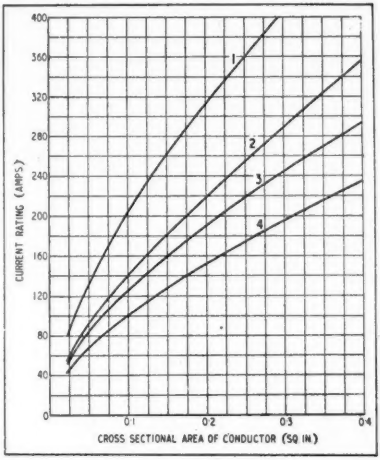
TESTS on the lighting of a section of a Leeds mill having eighteen looms are reported in the summer number of *Lighting Service* (the E.L.M.A. publication). The original installation consisted of one 100-W drop pendant lamp between each pair of loom faces and a similar one of 60 W between each pair of loom backs, giving an average of about 7 L per sq ft. Best results were given with 20 to 30 L per sq ft in the centre of the cloth at the front, using 80-W fluorescent lamps across the sley. Annual gross profit was £43 11s. 0d., which was £3 more than with 200-W filament lamps in dispersive reflectors. After allowing for increased costs, the net profit of £32 2s. was £1 15s. 6d. more. Increased kWh per loom per annum amounted to 132 and 528 in the two cases, which gave correspondingly greater outputs of 10·1 (equivalent to 7·8 weeks' working compared with the original) and 8·8 per cent. A weaver minding eight looms, each with its former output of 103 yd per week raised to 139 and with faults decreased in the ratio of 3·9 to 1·64, increased his earnings by 26s. 8d. per week as a result of the better illumination with fluorescent lighting.

Cables in Mines

Types Used and Method of Installation

By C. C. Barnes, A.M.I.E.E.

THE arduous conditions of operation in mines necessitate special consideration in respect of the type of cable used and the method of its installation. Vulcanized-bitumen-insulated cables have the advantages of being light in weight, damp-proof and highly resistant to chemical action, properties particularly suitable for use in mineshafts and underground roadways. Unfortunately, their conductors tend to become decentralized at higher temperatures, so that the permissible temperature rise is very limited and consequently their current-carrying capacity compares unfavourably with that of cables with other types of insulants.



Permissible current loading of three-core mining cables in air (ambient temperature 80 deg F.)

(1) Paper-insulated lead-covered and wire-armoured, for 3,300 V. (2) Compound-insulated and sheathed, wire-armoured, for 660 and 3,300 V. (3) Paper-insulated vulcanized-bitumen sheathed, wire-armoured, for 660 and 3,300 V. (4) Vulcanized-bitumen-insulated and sheathed, wire-armoured, for 660 and 3,300 V.

This drawback resulted in the development of paper-insulated vulcanized-bitumen-sheathed cables, which have a higher current rating than the v.b. insulated and sheathed type and are considerably lighter than the standard impregnated-paper-insulated cables sheathed with a solid tube of lead or lead alloy in order to prevent the ingress of moisture.

The present position of British Standard Specifications for both types of v.b. cables is uncertain, since B.S.S. No. 7—1926, which gave design data for these cables, has been superseded by later specifications—B.S. 480—1942 for paper-insulated cables and B.S. No. 7—1946 for rubber- and thermoplastic-insulated cables, neither of which provided similar data for the v.b. cables. This is probably due to the steady decline during recent years in the demand for v.b. cables owing to the low conductor temperature permitted—normally of the order of 100 deg F—and the present tendency is to replace them by compound-insulated cables.

Compound-Insulated Cables

Compound-insulated and sheathed cables possess the same high resistance to deleterious influences as do v.b. cables, but they can be operated at a higher conductor temperature without decentralization; they are lighter than the paper-insulated lead-covered type and have the advantage of being semi-flexible. The accompanying curves show comparative current loadings for the various types of mains cables used for mining work.

To date the British Standards Institution has not issued a specification for compound-insulated cables. The nature of this compound insulation has not been disclosed, although Watkins[1] states "the idea prevails that it consists of a combination of rubber and bitumen, in other words that it combines the vulcanized-bitumen and rubber insulation into one component." Compound-insulated cables have given good service and are being increasingly used for mining work.

Paper-Insulated Types

Recent years have seen a steadily growing use of paper-insulated lead-sheathed cables in mines, since they provide a very economical means of transmission due to the high permitted current rating[2] (see curves). They allow the use of smaller (shaped) conductors for a given load, which helps to minimize weight, as compared with non-lead-sheathed types.

B.S. 760—Paper Insulated Cables for use in Mines—was published in 1938 and revised and re-issued under the same reference

number in 1943, the principal differences in the later specification being as follows:—The range of conductor sizes is reduced. Design data has been omitted for twin cables operating at 3·3 and 6·6 kV. Except for 0·0225 sq in. copper section (multicore cables), the choice between circular and shaped conductors permitted in the 1938 edition has been withdrawn and all such conductors are shaped. Armouring wires of diameters 0·056, 0·072, and 0·160 in. have been withdrawn. All 11-kV cables have been omitted.

In shafts and roadways permanently fixed cables should be of the paper-insulated type and preferably armoured with a double layer of steel wires separated by a layer of textile material and finished overall with compounded hessian tapes or a braid and compound. For vertical installations, "drained" cables (i.e. cables having excess impregnating compound removed) should be specified. Mining cables often have to operate in damp or wet conditions and, to ensure the most suitable form of protection against corrosion effects, full details of the conditions obtaining should be given in orders and inquiries. It is also recommended that samples of the water which may come in contact with the cables shall be sent to the cable maker for chemical analysis. Cables subject to vibration should preferably be sheathed with lead-tin-antimony (alloy E) as detailed in B.S. 801—1938.[3]

Earthing Requirements

Regulation 125 of the Coal Mines Act (1911) stipulates that all parts of an earthing system, including the lead sheath and armouring of a cable where connected to earth, shall have a conductivity at all parts and at all joints at least 50 per cent of that of the largest conductor used solely to supply the apparatus concerned. This requirement operates throughout the electrical system with the exceptions of very small flexible cables used in conjunction with portable lamps and of single-core armoured cables in which the conductance (reciprocal of the resistance measured in "reciprocal ohms" or "mhos") of the armour of each cable must be at least 25 per cent of the enclosed conductor. Also the earth conductor must be continuous and no switch fuse or circuit breaker may be inserted therein.

Clause 14 of B.S. 760—1943 states:—"Where the conductance required under Regulation 129 of the Coal Mines Act cannot be obtained by the use of galvanized-steel wire of the specified size, the required value may be obtained by the insertion in the armour of hard-drawn tinned-copper wire or wires of a size not smaller than that of the galvanized-steel wire." In calculating the conductance of the metallic coverings, the resistivity of galvanized-steel armour shall be taken as eight times and of lead as twelve-and-a-half times that of standard annealed copper. The same Regulation calls for a metallic covering on all cables operated at above low voltage, where the roadway conveying the cable is also used for mechanical haulage and where there is a risk of igniting gas, coaldust or other inflammable material. Steel-tape armoured cables are not intended to be used below ground under the Coal Mines Act.

[1] Watkins, W. "Progress in the Design of Colliery Cables": *Mining Electrical and Mechanical Engineer*, December, 1943, Vol. XXIV, No. 279.

[2] Barnes, C. C. "Current Rating of Paper Insulated Power Cables": *Electrical Communication*, 1942, Vol. 21, No. 1, p. 27.

[3] B.S. 801—1938, Lead and Lead Alloys for Cable Sheathing.

E.I.B.A.'s Increasing Activities

FAR from discouraging the voluntary efforts of the Electrical Industries Benevolent Association, the increase in old-age pensions and other official help is apparently having the reverse effect. The annual report of the Council for 1946 to be presented at the annual meeting of the Association next Thursday at the Institution of Electrical Engineers, London, points out that State action draws attention to a problem and attracts additional help to its solution. Furthermore, with some of the financial burden borne communally the amount left to be done is not so burdensome and there is a greater chance of being able to do the job thoroughly and hence a greater possibility of entering on the project. Typical cases of help that have been given are described in the report, with numerous letters of appreciation.

The Association's plan for establishing a number of experimental homes for old people, to be run on entirely new lines, was carried a stage further by the presentation by Mr. and Mrs. Cunning of their Surrey mansion, Broome Park, Betchworth, with 25 acres of grounds for use as the first of these homes. Nearly £4,000 more was paid out in grants last year than in 1945, and it is already apparent that possibly even a bigger increase in grants will occur this year. Consequently a greater effort than ever will be required to raise the necessary funds: particular attention is drawn to the advantages of covenanted subscriptions.

Practical Training

Joint Committee's Proposals for Professional Engineers

RECOMMENDATIONS regarding the training of professional electrical engineers in its practical aspects have been published this week by the Institution of Electrical Engineers (1s. post free). They are embodied in a report drawn up by a joint committee appointed by that body, the British Electrical and Allied Manufacturers' Association and the Radio Industry Council, of which Sir Arthur P. M. Fleming is chairman and Mr. H. J. Allcock is deputy chairman. The report is, in effect, an addition to the two I.E.E. reports on "Education and Training for Engineers" issued in 1943 and 1945. Its scope is restricted to professional engineers, who are defined as "fitted to undertake work requiring a high degree of personal responsibility" as distinct from technicians and craftsmen.

Sir Arthur Fleming, chairman of the joint committee

Two types of apprenticeship are considered, either of which calls for a good secondary education. The first is of two years (graduate apprenticeship) and relates to those who obtain their technical education by three or four years of full-time university study; the second is of four years (student apprenticeship) and covers those who follow part-time courses lasting four or more years at a technical college leading ultimately to a Higher National Certificate. Thereafter further functional and specialized training for at least two years should be obtained. For the graduate type the first year of apprenticeship would preferably be taken between school and university.

The report also suggests courses of study which should be provided and advocates the organizing by the apprentices themselves of associations for social, athletic and educational activities. It is considered that all but the smallest concerns should be able to devise satisfactory schemes of training with the co-operation of other engineering firms. The two types of apprentice have equal opportunities for advancement. A third type of apprenticeship in which alternate periods are spent in the factory and the college on the "sandwich system" is a compromise between the other two. In all cases at least twelve months of graduate apprenticeship should be served after the educational course has been completed.

A student apprentice should have a good leaving certificate from a secondary school, particularly in regard to mathematics, physics and English, and be preferably 17 to 18 years of age. The chief qualities to be looked for are personality, general intelligence and scientific knowledge. Student and pre-graduate apprentices should be required to attend part-time classes on one day each week. The main object of practical training is to familiarize the apprentice with the materials, tools and craft skill available in industry; the techniques and organization involved in design; developing, manufacturing, installing and operating equipment; the outlook of the men he will later control. His interests should later guide him into one of seven functional activities specified.

Allocation of Time

Each scheme of training is divided into three parts—basic mechanical, basic electrical and office. For graduate and pre-graduate apprentices the number of weeks allotted to each are 44, 36 and 24. During the mechanical period 8 weeks should be spent in the foundry, pattern making or metal fabrication, and similar periods on fitting and machining with 20 weeks on special operations of various scheduled kinds. In electrical training 12 weeks would be devoted to specifying and testing materials, processes and manufacturing methods, sub-assembly and testing. The remaining 24 weeks would be spent on assembly, erection and wiring of electrical equipment and on diagnosing defects. Under the heading of office training are 12 weeks spent in the preparing and implementation of production plans and 12 weeks in the drawing office on work on which the apprentice hopes to be employed. Vacations should be spent in foreign travel, power station maintenance, transmission and distribution of electricity, telecommunication operation and plant erection on site and later as supernumerary engineer in a cargo ship and on subjects of general and technical educational value.

Student apprentices in their first two years (approximately) should allocate their time in weeks as follows:—Assembly, 16; pattern shop and/or foundry, 16; metal fabrication, 8; Machining, 16; fitting, 24; special operations, 16. In the third year 24 weeks should be given to the electrical subjects scheduled for the first 12 weeks of the graduate apprentices and 32 weeks to the later weeks of the latter. The fourth year's programme would be 16 weeks on planning and progress, 16 weeks in the drawing office and the remainder on special products.

It will generally be desirable for those entering an operating concern to obtain part of their training in a manufacturer's works—for example, 26 weeks of the 104 in the course of a graduate apprentice. Provision should be made for transferring promising craftsmen apprentices on reaching eighteen years of age to the student group. In addition to spending one day a week at a technical college (not normally necessary for the graduate type) a student apprentice should be required to attend on one evening a week during the session. Every apprentice, during his first year, should also attend lectures of 1 to 1½ hours each in the works during working hours. He should be encouraged to collect information from reference books and journals and should have available a technical library and reading room.

All matters connected with education and training should be the responsibility of one person who should be a professional engineer with requisite qualifications for the position and himself preferably directly responsible to an executive director concerned with long-term plans for the provision of staff for the company. The report includes three appendices—one a form of application for apprenticeship, a second a model form of agreement between employers and apprentices and a third an extract from the I.E.E. By-Laws relating to qualifications of corporate members.

Fused Plugs

New Flat-pin Specification

BY the issue this week of B.S.1363, which is dated June 30th, the British Standards Institution seemingly closes another of the many chapters in the controversy about the size and form of the "all-purpose" socket outlet. Some manufacturers have already made prototypes; indeed one or two were on view at the B.I.F., but time alone will show whether the universality hoped for will result.

The new document (which is obtainable at 2s. 6d. net. from the B.S.I. at 28, Victoria Street, London, S.W.1) standardizes the 3-kW size (13 A at 230 V) of fused plug with three flat pins, fitting into a flush mounted and shuttered socket outlet, for general household and similar purposes. The pins are disposed and connected in the usual ways, but the plug top is designed to accommodate a cartridge fuse (not incorporated in one of the pins) and is required to be marked "fused" so that that word remains visible when the plug is in use.

The body and cover of the plug as well as the socket plate are to be made of insulating material, tough, non-ignitable, which will not soften when heated to 85 deg C and conforming to B.S. 488 plastic yield test. The base of the socket portion and the shutter must be made of the same material, which can be either an insulating substance similar to that of the plug, or nitrified ceramic. The socket box can be steel or cast iron.

All material dimensions are specified and tolerances indicated as well as tests to be applied. The assembly must be capable of breaking 17 A at 250 V (non-inductive a.c.) at 15 deg C, the temperature rise at 13 A being limited to 35 deg C. Fresh requirements are an a.c. flash test at 2,000 V and minimum insulation resistance of 100 megohms determined by applying d.c. at 500 V. Another test has been added to determine the effectiveness of the cord grip.

The specification includes detailed drawings of the gauges to be employed to prove the correctness of pin and socket spacings and also to check the withdrawal pull. The minimum withdrawal pull (measured with the standard gauge) for individual socket tubes must not be less than 8 oz or, alternatively, the maximum drop between an individual socket and pin (at 13 A) must not exceed 12 mV. The withdrawal pull of the plug from an outlet can be between 1·5 and 8 lb, which is appreciably less than for the 2, 5 and 15 A round-pin types.

The overall size of the new design approximates to that of the existing 15 A type. The new specification does not supersede B.S. 196, 1930, relating to reversible protected type two-pin plugs and sockets with earthing connections, or B.S. 546, 1934, concerning two-pole and earthing-pin plugs and sockets rated at 2, 5, 15 and 30 A, which remain in force.

B.S. for Wrought Steels

A second revised edition of British Standard 970, Wrought Steels (10s. 6d.) differs chiefly from those of 1941 and 1942 by the introduction of sub-divisions into certain specifications to meet the needs of some users whose heat-treatment facilities require material of closely controlled chemical composition.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Illumination and Eyesight

HAVING in mind the anxiety still expressed in some quarters as to possible effects of using fluorescent lamps, I recalled a report which was presented to the First Commissioner of Works in 1912 by Dr. E. Treacher Collins, F.R.C.S., L.R.C.P., as a sequel to questions asked in the House of Commons. This report, which appeared in the *Illuminating Engineer* for July of that year, stated:—" On April 26th, 1912, I, together with Dr. Parkes, visited the Debating Chamber at the House of Commons and inspected the present arrangements for lighting it with gas, and the proposed new arrangements for electric lighting, in order to see if the latter were in any way likely to be injurious to the eyesight of Members of Parliament.

" I found that the proposed electric lighting is to be effected by groups of three metal-filament incandescent lamps enclosed in a Holophane globe, which is placed over a square pane of ground glass having an amber tint, and an ornamental pattern on it.

" (*a*) Ultra-violet rays may produce irritation of the eyes; they are to a great extent cut off by the passage of light through glass, and are completely cut off by glass of an amber tint.

" The rays from the electric lamps at the House of Commons will be filtered by passage through three layers of glass; (i) that covering the lamp itself, (ii) the Holophane globe, (iii) the ornamental pane of glass. The ultra-violet rays will be cut off by the amber colour of the latter. There is, therefore, no fear that the eyesight of Members of Parliament will be affected by ultra-violet rays.

" (*b*) An amount of illumination equal to one candle-foot is the minimum amount usually considered requisite for reading purposes. I was informed that the amount of illumination on the benches with the present gas lighting is four-fifths of a candle-foot, and that the same amount or more, as I should think desirable, can be obtained with the electric lighting.

" The amount of illumination in all parts of the Debating Chamber is not the same. The illumination from the roof is supplemented on the back benches by lamps fixed to the pillars in front of them. These do what I was told was required of them, i.e., light up the faces of Members so that they can be seen by the Speaker. They are not, however, situated in the best position to enable Members on the back benches to read. For this purpose it would be desirable that the light should come from behind them.

" (*c*) Uniformity of illumination. Variations in the intensity of illumination at its source, so that there are glittering or glaring points, is often found to be a source of discomfort to the eyes. In the squares in the roof of the Debating Chamber I found the illumination to be more uniformly diffused and freer from points of a glittering character when they were lit by electric light than when they were lit by gas. This is accounted for by the dispersion of light which is produced by the Holophane globes around the electric lamps."

Evidently history does repeat itself!

London, W.C.2. A. G. PENNY.

Safe Installations

A CURRENT report of a fatality caused by using unearthed electrical equipment confirms me in my opinion that all domestic installations should be three-phase at 50 V r.m.s. between lines. This circuit could be used for the cleaning, lighting, radio and some forms of low temperature such as electric pads and blankets.

A three-phase circuit would have many advantages with squirrel-cage motors, which require less maintenance than single-phase and do not cause interference with radio reception. Lamps having a three-phase filament could no doubt be purchased and would result in a reduction in the pilfering of lamps from factories. In regard to radio, the only difference would be in the primary winding of the transformer and a single-phase supply could be taken for this purpose. Cooking and heating equipment could be arranged for a 230-V three-phase system using three-phase elements.

The greater amount of copper required to transmit a given amount of power at low voltage might be offset to some extent by using a metal-sheathed twin conductor and utilizing the sheath as one line, one phase being at earth potential. Further economy

could also be effected by using three-pin anti-flash sockets on the 50-V circuit without a switch. Finally a three-phase system would eliminate the load shifting operations carried out on present distribution networks when heavy single-phase loads are connected.

Chesterfield. A. JONES.

Transformer Iron

MR. NORRIS has put the transformer manufacturers' case very clearly, but there is another side to the story. Will the buyer of transformers be prepared to pay for the extra cost that the development and production of new steels necessitates?

Having been engaged in the manufacture of transformer steel and of transformers, I fully appreciate the desire for better steel, but the fact remains that before the war when hot rolled sheet with 0·54 and 0·49 W per lb loss at 10,000 gauss was readily available the demand was very small.

The saving in copper, weight of steel, oil, insulating material, transport and iron loss is certainly the fruits of improved transformer iron, but for such a harvest the transformer maker and buyer must agree to use the better steel wherever possible.

The great difficulty that is being experienced in obtaining adequate supplies of transformer steel suggests that the time is ripe for transformer makers to get together and decide just what development in transformer iron they desire and can afford, and then see whether the steel makers can rise to the occasion.

*London, S.W.*12. R. A. LOCKE.

Earthing Conductors

MANY small motors and starters do not allow for securely fixing earth-wire ends internally. I have been responsible for the fixing of many hundreds of earth wires externally in a sound and neat manner by fixing the earth wire every 6 in. by soldered copper wire binding and have not yet known of one that has broken. Earth-wire ends are often fixed within a motor terminal housing or starter case by being twisted round the cover-fixing screws and clamped down to the main case without the wireman knowing how secure the fixing is when completed.

The Factory Acts demand that flexible conduits shall be bridged for earth continuity by a separate conductor, but do not state the method of application. With the earth-wire fixed externally there is no doubt about continuity because it can be seen during routine inspection, which is the only way to ensure that plant is kept in a safe condition. Mr. Bristow correctly states "that a broken phase wire will show itself," often at the expense of a rewind, should an earth wire become disconnected. Within a motor or starter it may be at the expense of a machine operator because of the extra trouble necessary to check continuity when the earth wire is installed internally.

*London, S.E.*24. A. M. JONES.

WRITING with nearly fifty years of practical experience, I fully agree with Mr. Baughen that the long-standing method of running the stranded-copper earth wire on the outside of the metallic tube is the correct one. As foreman and journeyman on a number of large installations, I have been responsible for many hundreds of these connections which have been approved by authorities of indisputable standing and repute and have never yet heard of any of these connections breaking down.

*New Cross, S.E.*14. H. F. SAYER.

Engineering Units

IN answer to Mr. S. G. Blaxland Stubbs's letter in your issue of July 11th I suggest Megheatus (M.H.U.s).

East Horsley. CHAS. E. WHEELER.

Absolute Electrical Units

IN accordance with decisions taken by the International Committee of Weights and Measures in Paris last October, the system of electrical units employed at the National Physical Laboratory will be changed on January 1st, 1948, from "international" units (based on certain material standards) to "absolute" units derived from the centimetre, gramme and second.

The value of each absolute unit that is equivalent to one international unit is: 1·00049 ohms, 1·00034 volts, 0·99985 ampere, 1·00019 watts, 1·00049 henrys, and 0·99951 farad. These factors apply to the mean values of the international units as realized at the various national laboratories.

After January 1st next, apparatus manufactured before 1949 (and so marked) which is submitted to the Laboratory with a view to the issue of a National Physical Laboratory Certificate of Examination will be acceptable if its errors fall within the specified limits when the values are expressed in either international or absolute units. Apparatus manufactured after January 1st (or not marked with the date of manufacture) will be acceptable only if its errors fall within the specified limits when the values are expressed in absolute units.

Who is Lord Citrine?

Background of the Chairman of the National Electricity Authority

THERE is a tendency in some quarters to question the wisdom of appointing as chairman of the projected British Electricity Authority anybody but a man who has held a leading position in the electricity supply industry. Further than that, there have been definite attacks upon the man actually selected for the post. Nobody who knows the electricity supply industry as at present constituted can honestly maintain that profound electrical knowledge is essential to the occupier of the new position. He would immediately be asked "What are the electrical qualifications of Lord —, Sir —, and Mr. —, who are all in charge of great electrical concerns?"

Lord Citrine

No doubt there are eminent electrical men who would make admirable chairmen of the Authority, but there are also others whose technical knowledge might prove a limitation rather than an advantage. The chairman will have at his disposal the best technical advice obtainable; his job will be essentially an administrative one and his background should be of this character.

Perhaps not merely by chance, Lord Citrine, who has had many years of administrative experience, is not electrically ignorant. Although he did not remain in the electrical industry to reach the topmost heights, he was in it long enough to acquire the "feel" of it. He was born in Liverpool in 1887 and is thus in his sixtieth year. He entered the electrical trade at the age of sixteen and became prominent in the Electrical Trades Union. He still retains his membership as an electrician in the skilled section of the E.T.U. He became Mersey District secretary in 1914 and in 1920 was appointed assistant general secretary of the E.T.U. In the meantime (1917-1920) he acted as president, and subsequently as secretary, of the Federation of Engineering and Shipbuilding Trades, Mersey District. He took part in the formation of the National Joint Industrial Council for the Electricity Supply Industry and was a member of No. 3 North-Western Area Council.

Lord Citrine became prominent nationally in 1924, first as assistant secretary and then in 1926 as secretary of the Trades Union Congress, and internationally as president of the International Federation of Trade Unions, a position which he held for eighteen years. He was unanimously elected as the first president of the World Federation of Trade Unions in 1946.

He has served on a variety of committees and other bodies including H.M. Economic Advisory Council, the Treasury Consultative Council, the Nuffield Trust for the Forces, Nuffield College, the Court of Governors of the London School of Economics, the Cinematograph Films Council, the National Production Advisory Council, the Reconstruction Joint Advisory Council and the National Joint Advisory Council to the Ministry of Labour. He was chairman of the Committee on Regional Boards (Munitions Production) 1942, was an adviser to H.M. Government at the Ottawa Conference, and in 1938 a member of the Royal Commission on the West Indies. He was a director of the *Daily Herald* for eighteen years and served as vice-chairman for eight years. He is a Fellow of the Royal Statistical Society.

Lord Citrine has a thorough knowledge of European conditions and has written books on Russia, Finland and the United States as a result of his travels, as well as books on Trade Unionism and Chairmanship.

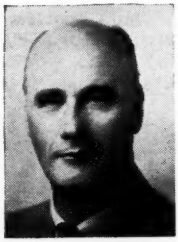
He was made a K.B.E. in 1935 and a Privy Councillor in 1940. He was created a baron last year.

During his long public service Lord Citrine has gained a great deal of valuable experience of men and industry, which, coupled with his early electrical experience, entitles him to be recognized as a competent first chairman of the British Electricity Authority.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Minister of Fuel and Power has appointed **Sir Henry Self**, K.C.B., K.C.M.G., K.B.E., as a member of the Organizing Committee for the Electricity Industry. Sir Henry, who entered the Civil Service in 1907, has served in a number of Government Departments and is now Permanent Secretary of the Ministry of Civil Aviation.



Sir Henry Self

Sir George Schuster has accepted the presidency of the Incorporated Sales Managers' Association in succession to **Mr. Harry Pickup** who retires in September next.

Mr. R. F. Hatto, sales director of S. Wolf & Co., Ltd., has just returned from a successful business trip which took him to the Union of South Africa, Northern and Southern Rhodesia and Kenya.

Mr. N. M. MacElwee, lecturer in the Department of Electrical Engineering, Birmingham University, has been appointed to the Chair of Electrical Engineering in University College, Christchurch, New Zealand.

Mr. P. W. D. Winkley, sales office manager at the head office of Macrome, Ltd., has been appointed branch manager at the company's Manchester office, 241, Deansgate.

The Inverness Town Council has been recommended to increase the salary of its electrical engineer, **Mr. N. B. MacArthur,** from £800 to £900, including war bonus.

Mr. N. Aish

Mr. Norman Aish, who, as reported on another page, has been elected president of the Electrical Contractors' Association and allied organizations, is principal of Aish & Co., Ltd., Bournemouth. Mr. Aish has already served as vice-president of the Association for two terms. He is an associate member of the Institution of Electrical Engineers.

Mr. Charles H. Roser, recently appointed managing director of Technical Publications, Ltd., Wellington, New Zealand, is expected in England towards the end of this month and intends to stay six months on business connected with his company, which owns the *N.Z. Electrical Journal* and *N.Z. Engineering* Mr. Roser has for many years been associated with several leading English electrical and engineering firms, acting as advertising manager for New Zealand agents. His London address will be c/o Lloyds Bank, Lombard Street, E.C.

Mr. D. S. Parry, A.M.I.E.E., has joined the staff of A. Reyrolle & Co., Ltd., and will shortly take up his duties as district manager in Northern Ireland. Mr. Parry's headquarters will be with Reyrolle's agents, A. E. J. Hurst, Ltd., 8, College Square North, Belfast.

Mr. H. W. Pasteur and **Mr. A. Greenfield** have been appointed directors of J. & E. Hall, Ltd. They are both members of the staff.

Mr. A. Shelton, M.I.E.E., a director and Manchester branch manager of Berry's Electric, Ltd., has retired after forty years' service with the company. He is, however, retaining his seat on the board. Mr. Shelton received his early training with Belliss & Morcom, Ltd., Verity & Sons and Dorman & Smith, joining Berry's in 1907. He has been manager of their Midland branch since 1914. **Mr. K. V. Rodgers** has been appointed Manchester branch manager. He received his early training with the oompany and during the war served with the R.A. in the Burma Campaigns. **Mr. J. J. Thompson** has been appointed general sales manager of the company, with whom he has been for twelve years as outside representative and Birmingham branch manager. He served with the R.A.O.C. in Normandy and Germany during the war.

Mr. A. Shelton

Mr. K. V. Rodgers

The fiftieth anniversary of the formation of Marconi's Wireless Telegraph Co., Ltd., which has already been officially commemorated by a convention of Marconi representatives from all parts of the world, held in London, by a jubilee exhibition and by the publication of a commemorative book, falls on July 20th. **Mr. H. W. Allen** is the sole survivor of the original personnel; during his association with the company he held the offices of secretary, general manager, deputy managing director and member

of the Board. Other early members of the company still living include Mr. C. E. Rickard who joined in 1898, and Messrs. Andrew Gray, C. S. Franklin, H. M. Dowsett, P. J. Woodward and W. Densham, who joined in 1899.

Mr. Andrew Watt has been appointed electrical engineer for the London & North Eastern Railway at Newcastle-on-Tyne.

Dr. J. W. Bondi, M.I.Mech.E., has been appointed a director of British Oil Engines (Export), Ltd., which is a subsidiary of Associated British Oil Engines, Ltd.

Mr. V. C. H. Creer, M.A. (Cantab) has been appointed general manager of the B.T.H. Lamp and Lighting Sales Department, Crown House, Aldwych, London. Mr. Creer, who was born in Australia, had experience on the London Stock Exchange and was an executive in the film industry for many years. On the outbreak of war he became an administrative officer in the Ministry of Economic Warfare, and was afterwards transferred to the Air Ministry. He later became well known to many executives in the lamp industry when, as Deputy Director of Lamp Production at the Ministry of Aircraft Production, he was made the Government production authority for all matters appertaining to electric lamps. Mr. Creer joined the Lamp and Lighting Department of the British Thomson-Houston Co., Ltd., in October, 1945, as assistant to Mr. H. A. Lingard, the director responsible for this section of the company's business.

Mr. V. C. H. Creer

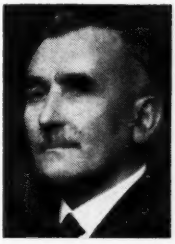
Mr. J. A. Walters has been appointed manager of the Carbon Department of the General Electric Co., Ltd., in succession to **Mr. T. Settle,** who retired on March 31st. Mr. Walters graduated in chemistry at King's College, London, and after a short time with the South Metropolitan Gas Co. and the Anglo-Scottish Beet Sugar Corporation, he joined the staff of the Research Laboratories of the G.E.C. in 1928. There he worked on various problems of a chemical nature. In 1937 he joined the head office staff of the company under Mr. Settle on the technical side of the Carbon Department. During the war he assisted in the operation of the British Arc Lamp Carbon Pool.

Mr. J. A. Walters

Mr. J. A. Harle, M.Sc., M.I.E.E., has been appointed Professor of Electrical Engineering in the University of Alberta at Edmonton, Canada, and is sailing early in August to take up his appointment on September 1st. He served his apprenticeship with C. A. Parsons & Co., Ltd., and studied at Armstrong (now King's) College under the late Professor W. M. Thornton, graduating with distinction in 1919. He was appointed Lecturer in Electrical Engineering at Armstrong College in the same year. In 1922 the late Mr. Clothier invited him to join the Technical and Research Department of A. Reyrolle & Co., Ltd., and he became head of the Department in 1937 when he succeeded Mr. B. H. Leeson. Mr. Harle served as chairman of the North-Eastern Centre of the Institution of Electrical Engineers during the session 1944-45, and he has been the Institution's area member for the Education and Training Advisory Service for returned Service members. He has taken part in the work of E.R.A., B.E.A.M.A., and I.E.C. Committees, being keenly interested in insulation and circuit-breaking problems, both from the research and from the standardization points of view.

Mr. J. A. Harle

Mr. W. C. S. Phillips, B.Sc., M.I.E.E., F.Inst.P., is retiring at the end of August, after twenty-eight years' service as Head of the Department of Electrical Engineering and Physics at the Borough Polytechnic. He actually reached the retiring age last session, but at the request of the governors of the Polytechnic continued for a further year to complete the re-organization necessary after the war. Mr. Phillips was educated at King Edward's Grammar School, Birmingham and went from there to Mason University College (Birmingham University). After obtaining his degree in physics, Mr. Phillips continued to take courses in electrical engineering and became a lecturer at the Derby Technical College. In 1907 he returned to Birmingham as a lecturer at the Central Technical College. During the whole of this time he was able to devote considerable periods to research work on electrical instruments with Dr. W. E. Sumpner, with whom he produced a joint work on "An Alternate Current Galvanometer." In 1914 a new wing was opened at the Stoke-on-Trent Technical

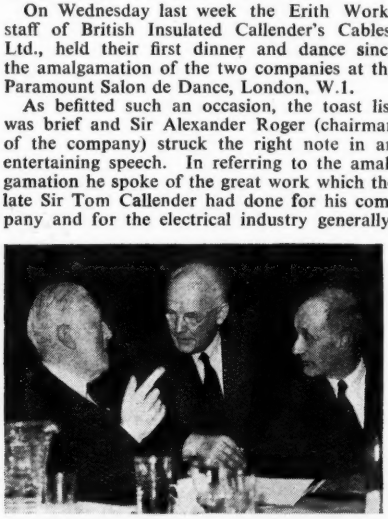


Mr. W. C. S. Phillips

College especially for electrical engineering work as applied to the mining and pottery industries, and Mr. Phillips was appointed to start the Department and to arrange for its equipment. He continued there until 1916 when he joined the Aeronautical Inspection Department, being put in charge of research work, and was commissioned in the R.A.F. At the conclusion of the 1914-18 war he was appointed Head of the Department of Electrical Engineering and Physics at the Borough Polytechnic. He started with a staff consisting of one full-time and ten part-time assistants and now has fifteen full-time and between sixty and seventy part-time assistants, with 110 full-time and more than 1,400 part-time students.

On Wednesday last week the Erith Works staff of British Insulated Callender's Cables, Ltd., held their first dinner and dance since the amalgamation of the two companies at the Paramount Salon de Dance, London, W.1.

As befitted such an occasion, the toast list was brief and Sir Alexander Roger (chairman of the company) struck the right note in an entertaining speech. In referring to the amalgamation he spoke of the great work which the late Sir Tom Callender had done for his company and for the electrical industry generally,



Sir Alexander Roger, Mr. E. F. Sargent and Mr. H. Hill at the dinner of the Erith Works staff of B.I. Callender's

and expressed the hope that the staffs of B.I. and Callender's would get together and become one happy family. He suggested that a message of good wishes should be sent to Mr. C. Pipkin, who recently retired from the board. Referring to the success of the recent visit of shareholders to the Prescot Works, Sir Alexander said that the shareholders, staff and workers should get to know each other and although it was a big job the board was going to try and do it. He mentioned that Mr. H. Hill, Erith Works manager (who presided at the dinner) would be retiring next year and asked the company to join him in offering their good wishes for his health and happiness.

British women engineers met at the Forum Club, London, on Tuesday to do honour to **Dame Caroline Haslett** created D.B.E. in the Birthday Honours.

Obituary

Mrs. G. S. Helme.—Her many friends will learn with regret of the death of Mrs. G. S. Helme, wife of Mr. G. S. Helme, manager in Scotland for Lancashire Dynamo & Crypto, Ltd., and associated companies.

Mr. W. E. Brunt, formerly borough electrical engineer at Todmorden, died on July 8th at the age of seventy-one. Mr. Brunt went from Nelson Corporation to Todmorden on the opening of the electricity works in 1905. He retired in July, 1941, having been borough electrical engineer since 1920.

Power Station Schemes

Plans for Accelerating Construction

A MINISTRY of Works announcement issued on Tuesday states that building and civil engineering work to the value of £75,000,000 will be carried out on electric power stations during the next two years to help bridge the gap between the supply of electricity and the growing demands. Site work is in operation on sixty-three building projects which will house plant capable of generating over 5,260,000 kW. Plans for thirteen further projects to provide 1,205,000 kW have been approved and site work will start shortly. A further programme covering the next two years is being drawn up.

Special efforts are being made by the Ministry of Labour and the Ministry of Works to ensure that all contracts let for the erection of power stations are fully manned and receiving a continuous flow of all the building materials they require. Arrangements have been made through the Cement Makers' Federation for cement orders for these projects to have first call on deliveries both direct and through merchants. The Timber Control has made arrangements to secure speedy supplies of the timber necessary. Special arrangements have been made to ensure that the buildings programme is co-ordinated with the engineering production programme of the Ministry of Supply.

An Inter-Departmental Committee on which are represented the Electricity Commission, the Central Electricity Board and the North of Scotland Hydro-Electricity Board, sits under the chairmanship of a Ministry of Works official to speed up the supply of labour and civil engineering resources, and has appointed Working Parties to resolve day-to-day problems. Meetings have been held with the chief engineers and consultants and the principal engineering contractors to afford them an opportunity of offering advice on how work can be expedited. Close co-operation is being maintained with the trade unions. The Ministry of Works is advising on measures to increase output on civil engineering work and generally assisting in ensuring that the construction programme is accelerated in line with that of plant.

Views on the News

Reflections on Current Topics

AS I anticipated at the time of Mr. Dalton's Budget announcement in April regarding Purchase Tax alterations, one electric immersion heater manufacturer at least is avoiding the tax by producing a model with a loading of 3·2 kW, the tax being applicable only to units of 3 kW loading and under. Whether the Chancellor will let the company get away with this remains to be seen. The most satisfactory and sensible solution would of course be the removal of the tax from water-heating apparatus altogether. If the imposition of the tax was, as I understood it to be in this case, intended to act as a deterrent to sales, this object is not being served since the demand is still very much ahead of the supply.

* * *

A short time ago there was a strike at one of the North of Scotland Hydro-Electric Board's sites because the tea provided was said to be unsatisfactory. At Inveruglas recently a man complained about the food and was told to leave, whereupon there was another strike. It is said that the best approach to a man's heart is via his stomach and it looks as though the Board should engage better chefs so as to avoid these dietetic disputes.

* * *

How tired I am of "short supply," "high-ranking," "tripartite" and the rest of that unholy language which has been handed down from "official circles" to the general public. Speaking on the proposed co-ordination of electricity supply between Eire and Ulster, Sir Roland Nugent, leader of the Northern Ireland Senate, said that there had been "consultations on a technical level." I am quite sure that he meant technical talks.

* * *

I hear that the Blackpool Town Council, by a small majority, has declined to approve the appointment of a councillor who is an electrical contractor as vice-chairman of the Electricity Committee. I suppose from one point of view it is doubtful whether such an appointment would be suitable as the councillor would have a say in running what is in part a rival business. On the other hand a man who knows the ropes would see that electrical contracting by the Corporation was on the right lines, i.e., carried out in an economic way. It is a nice problem but I think that upon the whole I should vote in favour of such an appointment. A man with knowledge of the business is generally less troublesome to those who have to do the work than one devoid of it.

* * *

Anyone who has ever owned a refrigerator will agree that it is never too big. It comes as something of a surprise, however, to learn the extent to which the demand for larger apparatus has advanced in the United States. Before the war, during the period 1935-39, 85 per cent of the electric refrigerators sold were under 7 cu ft in capacity; but during January, 1947, only 1·9 per cent of the units sold were of under 7 cu ft capacity, 77·2 per cent were 7 cu ft, 3·8 per cent were 8 cu ft and 17·1 per cent were 9 cu ft and over. Admittedly climatic conditions are very different across the Atlantic and there is more food there to store, but these figures serve to show what a long way we have to go to get away from the 1½ and 3 cu ft mentality. Not but what the smallest refrigerator is better than no refrigerator at all.

* * *

We have it on W. S. Gilbert's authority that a policeman's lot is not a happy one but in at least one respect it compares favourably with that of the shift charge engineer. A correspondent to the *Electrical Power Engineer* points out that in the Metropolitan Police there is a pension of two-thirds salary after 30 years' service or half after 25 years. The shift engineer has to go on until he is sixty-five before he is superannuated which the writer considers is far too long when nimbleness of mind and body are necessary on the job. His suggestion is that there should be optional retirement after thirty years' service.

* * *

Considering how much the enlarged Civil Service costs the taxpayer, I think the Northern Divisional Executive Council of the E.P.E.A. was probably justified in taking a "dim view" (the phrase used in the *Electrical Power Engineer* report) of a proposal "that subscriptions should be increased to enable the Association to employ more permanent officials."—**REFLECTOR.**

Electricity Bill

Debate in the House of Lords

AFTER a seven-hour debate the Electricity Bill was given a second reading in the House of Lords on July 8th. In moving the second reading the Lord Chancellor (Lord Jowitt) contended that the present state of the electricity supply industry was " chaotic "—not through the fault of the supply authorities but because of the hampering effect of out-of-date legislation. Lord Jowitt referred to the McGowan Report and said he accepted the Committee's facts but differed from its conclusions. The Government had decided to accept a scheme of reorganization which the Committee had not favoured rather than the one which it recommended. He claimed that the scheme proposed would reduce dislocation to the minimum. In the whole of the debates on the Bill he had seen no alternative solution propounded.

The Industry's Record

Viscount Swinton said that the electricity industry had a record of efficiency. Nobody on the Government side claimed that nationalization would cheapen electricity. He thought the Lord Chancellor was unfair in describing the condition of the industry as chaotic in view of the way in which it had got the country through the war. The Electricity Commissioners, working on the lines of the McGowan Report, could have produced a very good scheme and one advantage of following the report would be the maintenance of desirable competition between gas and electricity. After criticizing the compensation terms, Lord Swinton said that it was singularly unwise of the Government to add this Bill to its commitments. However, if the Government insisted, they would try to improve the Bill.

Lord Rennell said that a piece of major electricity legislation had become necessary. People in the industry itself would agree that a reorganization was needed and the country appeared to desire a scheme partaking of nationalization. There were, however, two serious blots in the Bill in its present form. One was the retention by the Minister in his own hands of all the principal appointments. The other was compensation; to take the Stock Exchange valuation seemed to have no ground whatsoever in logic, justice, equity or finance.

The Earl of Lytton said that existing undertakers could develop and cheapen supplies if they were given additional plant and better and cheaper coal. The object of the Bill was purely political. An accusation of inefficiency on the part of existing undertakings was implicit in it but could not be substantiated as Lord Lytton showed by quoting as a typical example the undertakings with which he was connected. The Bill was ill-timed and would not produce a single additional unit of electricity. The proposed administrative machinery would certainly not engender efficiency. Finally, there was anxiety among the workers whose conditions were now good but were not properly protected by the Bill.

Lord Brabazon of Tara agreed that larger areas were needed, but any necessary reconstruction could have been carried out more smoothly and giving all concerned a fair deal. The industry would regret the disappearance of the Electricity Commissioners who had done great work, and of the Central Electricity Board which was to be praised for the imaginative way in which it had dealt with generation. The great municipalities and the companies had also done well and he asked what basis in equity had the Minister in taking away the chairmen's jobs without compensation when they had done more in the industry than any technician. The manufacturers and consumers would not benefit either. It was the Minister's triumph that he had made every section of the industry disappointed, downhearted and sour.

Lord Morrison dealt with the position of Scotland under the Bill and maintained that there could be no complaint that that country was not getting a square deal.

Viscount Ridley referred to the operation of the company of which he is chairman (the North Eastern E.S. Co.) and said that its area was to all intents and purposes the same as that of one of the proposed Area Boards. His company had proposed publicly owned boards independent of one another and independent of the centre except through commercial activities with the Central Electricity Board and except for general directions as to policy by the Minister of Fuel and Power. About thirty such boards would be the right number for the country. He regretted to see a Bill which would tear to pieces the only example of a completely integrated system of generation and distribution in one of these large areas.

Political Pressure

Lord Barnby (a member of the Central Electricity Board) said that while his Board was free from political pressure the British Electricity Authority would be subject to it. He regretted that as a result of this the chairman of the Central Board had felt obliged to resign. He admired Lord Citrine's qualities but he thought Lord Citrine had not the technical knowledge to carry out the difficult and technical task which the head of this great undertaking required. Lord Barnby concluded by expressing the opinion that the Area Boards should have greater authority and financial responsibility.

Lord Lloyd considered that if the Electricity Commissioners were given the necessary powers of compulsion the industry could be reorganized without the dislocation which was inevitable under the Bill.

Lord Lucas of Chilworth said that those with experience in the industrial field had come to the conclusion that the main basic production industries must come under public control if the future economy of the country was to be saved. He pointed to the great disparity between the horse-power per worker employed in the United States and the equivalent figure of this country and criticized the cost of electrical appliances here.

Lord Rochdale said he believed that there was a danger that too little responsibility would be left with the local electrical engineers, and Lord Wolverton spoke of the great rural electrification plans which had been made but which were being held up by lack of material.

Viscount Elibank agreed that all parties desired the reorganization of the electricity supply industry, but it could have been carried out in other ways which would not cause the dislocation which would result from the Government's scheme. But as nationalization of the industry had to be accepted it was the duty of the House of Lords to do what it could to improve the Bill.

After further debate Viscount Hall replied for the Government. He denied that any appointments had been made by the Government except of suitable persons. He deprecated Lord Barnby's reference to Lord Citrine, who had served in the electrical industry for years. To give the Area Boards a proper status they must not be creatures of the Central Authority and that was why their appointment was in the hands of the Minister. He was convinced that nationalization would be for the great benefit of the people of this country.

PARLIAMENTARY NEWS

By Our Special Reporter

LAST week in the House of Commons Lady Grant asked the Minister of Supply if he was aware that the shortage of raw materials for the manufacture of electrical equipment was becoming so acute that even orders carrying W.B.A. priority were being refused by some firms and accepted only tentatively for twelve months' delivery by others; and what action he was taking to remedy the situation.

Mr. Leonard said that while it was true that lack of raw materials was restricting production, the total output of electrical accessories was in general sufficient to meet essential requirements, although there were local shortages of certain types. Anyone unable to obtain reasonably satisfactory deliveries against orders carrying W.B.A. priority should take the matter up with the Ministry of Works Regional Materials Officer.

Load Shedding

On July 10th Mr. Prescott asked the Minister of Fuel and Power if he was aware of widespread concern, particularly in the North of England, at the great risk of load shedding next winter, and if he would make a statement particularly as to savings recently effected.

Mr. Gaitskell said that a statement would be made as soon as possible indicating the progress made in dealing with this problem and any further steps which the Government considered necessary. Asked when " as soon as possible " would be, he said he hoped within the next two weeks.

Tariff Anomalies

Mr. Channon asked the Minister of Fuel and Power whether he was aware that some electricity authorities in the country based their tariffs substantially on the rateable value of a consumer's house with the result that many persons found that although they consumed less electricity than their neighbours they had to pay more; and whether he would take steps at an early date to ban such tariffs, with a view to encouraging greater economy in the use of electricity.

Mr. Gaitskell, in reply, said that the methods of charging for electricity had recently been under expert examination but they must wait until the industry was nationalized before these tariff anomalies could be successfully tackled.

Mr. Blackburn asked whether, in view of the extraordinary urgency, representations could be made now to the local authorities to deal effectively with the problem. Mr. Gaitskell said that not only local authorities were concerned. It was quite out of the question, at short notice, to interfere with millions of private agreements.

Electricity from Scotland

Replying to Colonel Clarke, Mr. Gaitskell said that during 1946 there was a net transfer from Scotland to England of 47 million kWh. The maximum power transfer was 146,000 kW from Scotland to England (which occurred from 9 to 9.30 a.m. on March 14th) and 80,000 kW from England to Scotland (which occurred from 10.30 to 11 p.m. on December 30th).

Overhead Line Poles

Sir Stafford Cripps, replying to Mr. Vane, said that the shipment of poles from Germany commenced late in September, 1946, and 5,348 poles suitable *inter alia* for carrying overhead electricity lines were received during that year; 19,590 poles had been received from this source

during the first five months of this year. It was not possible to make any precise estimate of arrivals during the latter half of the year, but it was hoped that they would continue at about the same rate as in the first part.

Staggered Hours

Mr. Osborne asked the Minister of Labour what other industries would be asked to follow the lead of the engineering trades union leaders and employers in agreeing to work staggered hours; in what industries could the greatest fuel saving be effected; and if all industries predominantly employing men would be urged to co-operate before a special appeal was made to those trades mainly employing women.

Mr. Isaacs said that with the help of both sides of the National Joint Advisory Council, all other industries were being asked to co-operate in solving this problem of spreading the electricity load during the coming winter. In particular, on the suggestion of Regional Boards, he had written specially to the furniture, clothing and printing industries in view of the special importance of these industries in certain districts. As regarded the second and third parts of the question, much would depend on local circumstances and the peculiar conditions of individual industries, which must be left to the Regional Boards and their local or district committees to assess.

Scottish Board's Finance

Mr. McKinlay asked the Chancellor of the Exchequer, what arrangements were being made to finance the capital programme of the North of Scotland Hydro-Electric Board.

Mr. Dalton said that the Board had made good progress with its programme of development on which £2,650,000 had already been spent and commitments of £11,750,000 had been incurred. The time had now come for the Board to make its first issue of stock, in order to fund the bank advances and to cover the further capital expenditure. The stock would be guaranteed by the Treasury. The issue would be for £5 millions of 2½ per cent North of Scotland Electricity Stock 1967-72, at par. The lists would be opened on July 17th and close on or before July 18th.

Purchase Tax Notice

THE Commissioners of Customs and Excise have issued Notice No. 78H which sets out the alterations in purchase tax made in the Finance Bill and amendments thereto proposed by the Chancellor of the Exchequer, particulars of which we have already published.

As we have reported, space-heating and water-heating apparatus is to be subject to a tax of 66⅔ per cent. Examples of chargeable articles are:—Electric and gas fires and heaters, whether fixed or portable; stoves, grates and fireplaces designed to burn solid fuel, but having also provision for alternative heating by electricity or gas, e.g., fireplaces provided with electric radiator panels; gas and electric convectors and radiators, including mains-operated car heaters; air conditioning and similar appliances operated by gas or electricity; gas or electric towel rails and heaters; immersion heaters with loading not exceeding 3 kW; instantaneous water heaters (other than stillroom equipment), such as geysers, single and multi-point water heaters; electric storage water heaters not exceeding 30 gallons capacity; gas-operated central heating plant rated at less than 150,000 B.Th. U. per hour; fireguards and other furniture incorporating heating elements; boiling rings and hot-plates adaptable for use for space heating.

The Budget Resolution provided for tax at the rate of 66⅔ per cent as from April 16th on a wider range of gas and electrical appliances than is specified in this heading. Articles to which the 66⅔ per cent rate is not now to be applied revert to their pre-Budget position, either exempt from tax, e.g., electric refrigerators or gas cookers, or chargeable at the rate of tax ruling before April 16th, e.g., electric vacuum cleaners and washing machines. Reference should be made to Notice No. 78 (December, 1946, issue) for information as to the liability of such appliances.

No trader will be accountable for tax at the 66⅔ per cent rate on electrical and gas domestic appliances which are not specified in this heading. All traders concerned will thus be free to repay to their customers any increase in price they have charged on such articles in respect of the expected increase in tax. It is proposed to include in the Finance Bill a provision entitling buyers to reclaim any such increase in price from their suppliers.

News from Australia

WRITING on July 4th our Australian correspondent states that flood waters near the head of the Derwent River (Tasmania) are endangering the power station at Tarreleah. Main transmission lines in several parts of the State are down, and power has been cut off in many districts.

Tenders are being called, returnable in four months, for the necessary generating equipment to complete No. 2 section of the new South Fremantle power house. Equipment will comprise two 25,000-kW 50-cycle turbo-generators, together with the necessary boiler equipment, switchgear, etc., making with No. 1 section (for which tenders were called in 1945) a total installed capacity of 100,000 kW.

A 4,000-kW turbo-generator at the East Perth power station suddenly disintegrated recently, but fortunately without damage to neighbouring units. It had been running more or less constantly since 1917.

COMMERCE and INDUSTRY

Street Lighting Economies. New Research Laboratories.

LIGHTING authorities throughout the country have been asked by the Minister of Transport, the Rt. Hon. Alfred Barnes, M.P., to adopt from August 10th (when Double Summer Time ends) a standard of street lighting which will achieve a minimum saving of 50 per cent on pre-war fuel consumption. A request for a similar standard was made to lighting authorities in 1946, but the actual saving amounted to only 30 per cent. Full co-operation would save a further 200,000 tons of coal per year.

The general basis on which lighting authorities are asked to make their plans is contained in a circular letter to local authorities. Trunk roads and classified roads in built-up areas should be lighted to a good standard, economies being effected by a saving in the lighting of other roads.

Power Engineers' Salaries

The present schedule of salaries of the National Joint Board of Employers and Members of Staff is to remain in force until the end of the year. It was printed in our issue of April 26, 1946. The schedule has been related with the official cost-of-living index and consideration is being given to the effect of the introduction of the new index which came into operation recently.

Awards for E.P.E.A. Papers

The premium awards offered through the National Technical Groups to members of the Electrical Power Engineers' Association for original papers on electricity generation, transmission, distribution or utilization have been increased. They are now ten guineas and five guineas respectively.

Wartime Radio Sets

The Board of Trade has made an Order revoking the control of prices and conditions of supply of those types of radio receiving sets known as wartime civilian receivers. The Order came into force on July 14th, but attention is drawn to the fact that the manufacture and supply of radio receiving sets generally remains controlled under the Wireless Receivers and Radio Gramophone (No. 1) Order, 1947.

Scientific Instruments Research

Speaking at a lunch in London to celebrate the opening of the new laboratories of the British Scientific Instrument Research Association at "Sira," Southill, Elmstead Woods, Chislehurst, Kent, Sir Edward Appleton, secretary of the Department of Scientific and Industrial Research, said that the scientific nstrument industry was situated at the corner of a triangle, the other corners being occupied by science and by the users of instruments. From the development of science came the warp and weft from which the fabric of instruments was made. From user needs came the prompting of definite objectives. It was a good thing for a research organization to have such stimulation from the user. In its move toward greater efficiency, British industry would make more exacting demands on the ideas and products of the British Scientific Instrument Research Association.

Carnival Display

During a recent carnival held in Chichester the Corporation Electricity Department entered a decorated vehicle which had for its subject

Chichester Electricity Department's entry in the recent local carnival

the fuel-saving campaign. This had an enlarged model of a switch with the appropriate wording "Keep it up"!

Nationalization and Responsibility

Upon the occasion of a recent visit by members of the Cheltenham Electricity Committee and their engineer, Mr. R. W. Steel, to the Stourport station of the S.W. & S. Electric Power Co. the general manager of the company (Mr. D. H. Kendon) gave an address on past development and future prospects in the electricity supply industry. He claimed that the Edmundsons group for some years past had pursued a policy which had resulted in developing a supply of electricity throughout a very large area at progressively reducing prices and had provided the public with a good service.

The essentials of success in this sphere were the delegation of responsibility to local managers, no division of responsibility in any place, and men must be permitted to see the results of their efforts. What the S.W. & S. Company had done for many years was not very different from what it was proposed that

the Area Boards should do in future. If the new organization attached sufficient importance to the three essentials he had enumerated it would succeed. Although the Electricity Bill envisaged autonomy for the Area Boards, the more it was discussed the more he (Mr. Kendon) feared a tight control by the National Authority. In turn, the National Authority might be tightly controlled by the Minister of Fuel and Power and the Treasury, but he did not fear this very much, because if it were wisely managed by the engineers it would be highly successful. Mr. Kendon made an appeal for freedom of judgment for those who had to carry out the work. He concluded by giving some details of the Stourport station.

Indian Motor Industry

A request for the imposition of higher import duties upon electric motors was recently made by Indian electric motor manufacturers. An inquiry was held by the Indian Tariff Board which was informed that at present there were about half a dozen manufacturers and others were contemplating starting up. The productive capacity was said to be for about 20,000 machines a year of an average rating of 5 h.p. and actual production in 1946 was between 9,000 and 10,000. There was an estimated demand for 300,000 h.p. The Indian product was claimed to be as good as imported motors.

The Board found that the prices of imported machines were higher than those of comparable Indian motors and it was considered that the Indian producer was not in need of further protection.

High-Voltage Cable

Although the primary purpose of a new brochure (47 pages, 60 figs.) issued by Enfield Cables, Ltd., is to describe the technical features of the compression cable and accessories, its interest is wider. It deals lucidly with the fundamental factors that govern cable design generally at voltages above 33 kV up to 264 kV, such as the suppression of ionization, the effect of gas pressure and testing technique.

Illuminating Engineering Courses

The Illuminating Engineering Society states that in response to the demand for courses in illuminating engineering, two have been arranged to take place in London during the period September, 1947, to May, 1948, one at the Northampton Polytechnic on Wednesday afternoons and evenings, the other at the Borough Polytechnic on Thursday afternoons and evenings. These are considerably shorter than the normal full-time courses hitherto arranged. Many employers will, therefore, doubtless be willing to release candidates on their staff for one afternoon a week and the candidates themselves be willing to devote one evening a week to this training. The courses will prepare candidates for the City and Guilds of London Institute intermediate examination in illuminating engineering. Those wishing to enter their names for either of these courses should communicate with the Polytechnic concerned.

A course has also been arranged at the Central Technical College, Birmingham, to commence in September this year and other courses are in prospect at Cardiff, Leeds, Liverpool and Manchester.

Three Nations' Power Pool

The International Conference of the Public Utilities Panel, which has just ended at St. Anton, Vorarlberg, Austria, has decided to set up a Czech-Polish-Austrian commission to study the exchange of electric power among the three countries. Under a provisional scheme Austria will provide electric power during the summer, while Poland and Czechoslovakia will supply it during the winter.

Signals Officers Visit Mullards

In co-operation with the P.R. Department, War Office, a three-day visit to the various companies of the Mullard organization by a party of officers from the Royal Corps of Signals took place on June 23rd-25th. The object of the visit was to give selected Army Signals personnel an opportunity to meet executives responsible for the development and production of much of the equipment they have to use and at the same time give them an insight into various manufacturing processes. The officers toured the research laboratories, electrical engineering department, valve factory, etc.

Instrument Conference

The International Liaison Committee of the Second Instrument Conference and Exhibit has extended invitations to engineers of all countries to attend the Second National Instrument Conference and Exhibit which will be held at the Stevens Hotel in Chicago from September 8th to 12th.

X-ray Apparatus for London Hospitals

The London County Council Hospitals and Medical Services Committee is to ask the Council to approve an estimate of £46,700 for replacing X-ray apparatus at twenty-one general and special hospitals.

Conducting Dust

In a letter to *Nature* (14th June), Mr. K. Goldschmidt reports the results of investigations into the conductivity characteristics of dust such as might bridge a gap and cause electrical breakdown. He shows that when compressed at 10 and 50 lb per sq in. the typical sample prepared behaved initially as a symmetrical semi-conductor with conductivity increasing with applied potential gradient, reaching a critical value at which the conductivity characteristic became non-reversible and a decrease

of potential gradient (either a.c. or d.c.) led to conductivity hysteresis. At relatively high compressions, conduction tended to become predominantly metallic. Leakage of current was then large enough to cause heating and the positive temperature coefficient of the metal gave rise to an erratic hysteresis effect at 100 lb per sq in. and a falling conductivity at higher values of potential gradient at 200 lb per sq in.

Stockholm Instrument Exhibition

In connection with a four-day congress, arranged by the Swedish Academy for Engineering Research and the Swedish Association of Technical Physicists, an exhibition was held during last month in the Royal Tennis Hall, Stockholm, where sixty-three exhibitors representing 221 manufacturers from eleven countries demonstrated their latest novelties in the field of measuring instruments. An infra-red spectro-photometer of English design, by means of which organic substances of all kinds can be irradiated and their radiation absorption measured, attracted special interest. Among the Swedish exhibits may be mentioned Prof. Manne Siegbahn's electron microscope, and an instrument for measuring the fineness and quality of surfaces by means of a high-frequency current. A spectral-line photometer, which can measure the temperature of molten steel right down in the melted mass, electron microscopes, etc., were among the American exhibits, and in the Swiss section there was a new high-frequency pulsometer with a capacity of 3,000 load tests per second.

Copper Price Changes

The Ministry of Supply has made the Control of Non-Ferrous Metals (No. 29) (Copper, Lead and Zinc) Order, 1947 (S.R. & O. No. 1447, 1947, H.M. Stationery Office, price 1d.) which came into force on July 14th. This Order further varies the Control of Non-Ferrous Metals (No. 22) (Copper, Lead and Zinc) Order. It reduces the maximum price of copper; increases the margin for black hot-rolled copper wire rods; and provides for higher premiums on copper shapes. The maximum price for high-conductivity electrolytic copper is reduced by £5 per ton from £137 to £132 per ton delivered. Prices for other descriptions of copper are correspondingly adjusted except in the case of black hot-rolled copper wire rods where the new price is £138 per ton against £142 and where the margin over the copper price is now £6 per ton instead of £5. Inquiries should be addressed to the Directorate of Non-Ferrous Metals, 20, Albert Street, Rugby. (Rugby 2131).

Acquisition of Non-Ferrous Metals

The Ministry of Supply announces the withdrawal of the restriction whereby the issue of licences for copper, zinc and tin metal, as supplied by the Directorate of Non-Ferrous Metals, was limited in accordance with the applicant's rate of consumption, stock and forward purchases. Thus, applicants for licences (and contracts) for these metals will, in future, need to give only the one guarantee that their application is against orders for their products, full allowance having been made for their intake of scrap. As regards lead, the similar restriction applying to contracts (instead of licences) issued by the Directorate is also withdrawn.

Non-Ferrous Scrap Metal

The Ministry of Supply has issued a list of prices of non-ferrous scrap metals at Ministry depots, subject to there being sufficient material of that particular quantity available at a convenient depot at any particular time. The list refers to delivery within the current and next three calendar months, but is published without prejudice or commitment. Inquiries should be addressed to the Directorate of N.F. Metals (Scrap Disposals Dept.), 31J43, Norfolk Square, London, W.2 (telephone: Paddington 3434, Extension 3).

Colliery Year Book

The 1947 edition of "The Colliery Year Book," the first issue since the mines were transferred to the National Coal Board, is now available. Much of the contents is entirely new. In addition to a section devoted to the composition and disposition of the National Coal Board and its personnel, a list of mines is shown in Divisions, Areas and Sub-Areas, with a full index. A list of the former colliery owners is also included, giving the names of the directors and officials and the mines formerly owned by them. The Nationalization Act of 1946 is given in full. The handbook is published at 25s. by the Louis Cassier Co., Ltd., Dorset House, Stamford Street, London, S.E.1.

International Chemical Congress

The Prime Minister, Mr. C. R. Attlee, will be a guest and is expected to speak at the gala dinner of the eleventh International Congress of Pure and Applied Chemistry at the Dorchester Hotel, London, on July 23rd. The Congress, which opened yesterday and closes on July 24th, is being attended by about 2,000 members, including 392 official delegates from twenty-eight countries, the most strongly represented being the United Kingdom, France, Italy, the United States, Scandinavian countries and Switzerland.

The subject-matter is divided into fourteen sections and the large number of papers include: B. Orsoni (Italy) on preconcentration of heavy water in electrolysis plant, R. Piontelli (Italy) on the electro-chemical behaviour of metals and the autodeposition of lead, E. R. Dobbs on electro-deposited anti-corrosion coatings, U. R. Evans on experimental evidence of the electrochemical mechanism of corrosion, F. Trombe on metallic disprosium and its magnetic

properties, Dr. Ivan Peyches on electrical and electrical-gas melting of glass, Sir Lawrence Bragg on a dynamic model of crystallization of plastic flow, Dr. L. Hartshorn on elastomers, plastics, glass and ceramics from the electrical standpoint, B. Lewis and G. von Elbe (U.S.A.) on the minimum spark energy for ignition of explosive gases and its significance in flame propagation (fuels and combustion section).

Spreading the Load

The Joint Consultative Committee held a special meeting on July 9th to consider the arrangements for spreading the electricity load during the coming winter. The whole subject was fully discussed, and the great urgency of the problem was emphasized by both sides. In particular, the question of the use of some form of compulsory power was considered where necessary to deal with unreasonable refusal to participate in agreed schemes. A recommendation was made that the Government should examine this question as a matter of immediate urgency. The recent engineering agreement to deal with the staggering of working hours was noted, and it was agreed that all industries concerned should be advised of the need to tackle any such outstanding questions without delay where this is not already being done. The problem of transport in connection with revised hours of working was also noted as one requiring special consideration in co-operation with the two sides of the industry.

Control of Civil Building

During the six months from August 1st to January 31st next the amount that can be spent without licence on building work remains restricted to £10. In addition, not more than £2 may be spent on a property in any calendar month in the period (on a non-cumulative basis). These limits are contained in the Control of Civil Building Operations (No. 9) Order, 1947 (S.R. & O. 1947 No. 1439) which has been made by the Minister of Works.

Contract Price Adjustment Formulæ

The latest figures for use in connection with the B.E.A.M.A. contract price adjustment formulæ are as follows:—Rate of pay for adult male labour as at July 12th: 110s. (unchanged). Board of Trade index figure for intermediate products, July 12th: 221·4, the figure for June (against 222·9 for May).

Fatality

At an inquest at Rugeley, Staffs, on William James (52) of Brereton, who met his death while pulling the cable of a coal cutter, it was stated by the chief electrician that there was a hole in the cable. Mr. R. D. Allison, the divisional electrical engineer for the National Coal Board said it was the policy of the Board in that area to employ the screened type of cable. They could not do it immediately, but all cables bought in future would be of that type. A verdict of " Accidental death " was returned.

M.E.M. Conference

The Midland Electric Manufacturing Co., Ltd., recently held its annual sales conference at its works in Birmingham, which was attended by the company's representatives from all parts of the United Kingdom. Mr. W. L. Barber, chairman and founder of the company, presided, and among those who attended was Mr. J. Thornell, the company's Australian representative who is at present visiting the works.

Radio in Schools

The London County Council is to spend £33,500 on the purchase and installation of radio sets for London schools.

Hertfordshire Show

The Hertfordshire Show will be held at North Mymms Park, Hatfield, on July 24th.

Trade Publications

Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester, 17.—Leaflets (BIL. 651/1-3 illustrated and DL. 651/2-1) on " Seascan " radar equipment for ships with list of vessels already fitted.

Telegraph Construction & Maintenance Co., Ltd., Telcon Works, Greenwich, London, S.E.10. —Illustrated catalogue with tabulated data on paper-insulated cables for up to 22 kV.

Brush Electrical Engineering Co., Ltd., Loughborough.—Illustrated brochure on power from process steam and specifying pass-out turbines.

Bowthorpe Electric Co., Ltd., Goodtric Works, Brewer Street, Oxford.—Illustrated leaflet (B.240) describing the fused tee distribution box.

Annual Holidays

The works and offices of the Phœnix Telephone & Electric Works, Ltd., will be closed from July 25th to August 5th for the annual holidays.

The works of Rist's Wires & Cables, Ltd., will be closed for the annual holidays from July 26th until August 5th.

Trade Announcements

Young & Wildsmith, Ltd., have reopened their branch at 41, York Road, Ilford, Essex (telephone: Ilford 2033).

Crompton Parkinson, Ltd., are moving on August 4th to Astor House, Aldwych, London, W.C.2, with the exception of the Electric Vehicle Division, which will remain at Electra House.

The Electrical and Radio Department of Richard Johnson, Clapham & Morris, Ltd., is now re-established at Jacem House, Trafford Park, Manchester, 17. A branch, with trade counter and showroom facilities, will be maintained at 7.9, Swan Street, Manchester, 4.

Electrical Contractors' Report

Mr. Drake's Review of Past Year's Work

AS is customary, the address delivered by the president of the Electrical Contractors' Association (Mr. Hamlyn Drake, B.A., J.P.) at the recent annual meeting was a combination of annual report with personal views.

Mr. Drake criticized the Government and said that because of the growing State interference in every direction it was impossible to avoid politics. He pointed out that the position of the country had worsened during the past year and the Government's nationalization policy had contributed to this deterioration. Referring to the Electricity Bill, Mr. Drake said that this measure not only nationalized electricity but gave powers for the establishment of a State manufacturing concern and for the first time in our history provided for retail trade between Government-sponsored organizations and the general public. The Association had endeavoured to secure that any competition with private enterprise in retail trading of this kind should be on a fair basis. The Minister of Fuel and Power had been sympathetic but a majority of members of the House of Commons would not accept the necessary amendments.

Mr. Hamlyn Drake

Their action led one to wonder whether they were afraid of fair competition or desired unfair competition. The Ministry had expressed a desire that there should be co-operation between the new authorities and the electrical contractors and would welcome them as "agents" —a position which they had always occupied. At present, generally speaking, a state of goodwill existed between supply undertakings and contractors which was good for the industry and the public. The actual ownership of the supply industry should not have any real effect upon the service which the contractor rendered to the industry and public, and the Association, which represented the reputable electrical contracting industry throughout the country, offered its assistance to and co-operation with the supply industry in its present and new forms.

Whether the manufacturing powers were exercised or not the manufacturers would have but one customer for all materials for service on the supply side of the consumers' terminals. He hesitated to think what would be the result of the competitive scramble which might arise, particularly upon export trade and research.

Mr. Drake claimed that there had never been such unanimity among electrical contractors as there was at present and this might be the reason why the membership (now over 2,000) and applications for membership had reached record numbers. It was clearly against the public interest that anybody who did not possess the three qualifications demanded by the Association should be admitted. These qualifications were technical knowledge, practical experience and reasonable business ability.

They were not unmindful of the position of men emerging from the Forces and the munitions industries who possessed the first two qualifications and for these "Class III" membership of the National Federated Electrical Association had been instituted. This was a kind of probation until, helped by the N.F.E.A., these men had achieved a reasonable degree of business stability, when they would be admitted as full members.

During the past twelve months also the Association's guarantee of work scheme had been introduced, in the absence of compulsory regulation, as a means of protecting the public against inferior work. The scheme covered the whole of the members and all installations from the largest job to the smallest. As from January last the work of every member was guaranteed to the extent of £500—a limit which was felt to be amply sufficient but which could be increased if experience showed this to be necessary. Mr. Drake said that although this scheme had been introduced the Association had complete confidence in its members' qualifications.

After a reference to the Association's representation on the I.E.E. Wiring Rules Committee, committees of the British Standards Institution and other bodies, the president dealt with the activities of the National Electrical Contractors' Trading Association (N.E.C.T.A.). He said that negotiations with the electric fittings manufacturers had not yet reached finality but there was every reason to hope for a satisfactory agreement.

Members of the Association had become "retail minded" to an extent never previously visualized and they realized their responsibility to the public. The public would gladly buy from the source where technical service was available and the electrical contracting industry should provide such facilities rather than leave the public exposed to suppliers whose only concern was turnover regardless of other considerations, including safety. In this connection Mr. Drake considered it absurd that in the face of the shortage of raw materials the public should be able to buy shoddy and dangerous appliances. There should be a ban on the use of material unless it was transformed into safe merchandise. Representations which had been made by the E.C.A. to the Government that the

public should be protected had remained unheeded. Mr. Drake criticized the retention by the Ministry of Works of the £10 limit upon unlicensed work which, he said, had resulted in a large increase in "black market" work, to the detriment of honest trading concerns.

While there was plenty of work to do, and work of an essential character, there was actually unemployment in the electrical contracting industry because of the lack of materials. Yet the Government itself had urged the necessity of creating some "incentive" arrangements for industry generally.

The president dealt with the new wages agreement and said that the question of a new wages structure was being investigated by a special committee of the National Joint Industrial Council. This committee was also considering the practicability of introducing a system by which wages could be related to production. Never before had the Electrical Trades Union been willing even to consider "payment by results" and until now the N.F.E.A. had shared the generally-accepted principle that in electrical installation work payment by results could so easily produce scamped and consequently dangerous work. So far no constructive suggestion had been put forward but an open mind must be kept pending the thorough exploration of the matter.

Observation of Wages Agreements

Slowly the differences in wages in various parts of the country had been diminished until to-day they had established one rate for London and another for the remainder of the country. It was hoped that there would soon be agreement upon the questions of paid bank holidays and a guaranteed period of employment. The Association deprecated the suggestion that the Ministry of Works' requirement that licensed contractors should observe industrial wages agreements might be withdrawn as it had proved a protection against unscrupulous wage cutting and inferior workmanship.

During the year the N.F.E.A. had explored with the E.T.U. the possibility of introducing a scheme for grading operatives, as a recognition of the fact that one operative was capable of greater efficiency and output than another. So far the Union had been unwilling to accept any such differentiation. They did not favour a proposal that the agreed rate should be a "minimum" and not a "standard" and that individual employers should reward individual employees according to merit. This would lead to a large number of rates in the industry instead of the standard which had proved an efficient and practicable basis of the wage agreements.

On the retail side of the business, it seemed obvious that the Minister of Labour intended to set up a Wages Council and the Association was discussing with the Ministry the question of representation.

In conclusion Mr. Drake referred to the increased interest of members in the Association's affairs, but appealed for even more, and he paid tributes to the officers and officials of the Association, making particular reference to Messrs. Green, Briggs & Parsons, the vice-presidents, Mr. W. H. Walton, chairman of the Executive Committee, and Mr. L. C. Penwill, the director. He mentioned that his successor as president was Mr. Norman Aish, who had already served twice as vice-president.

I.M.E.A. Centre Luncheon

REFERENCE was made to the future of the Incorporated Municipal Electrical Association at the annual luncheon of the Mid-East England Centre at Cleckheaton last week. Mr. G. T. Ellison (Spenborough), chairman of the Centre, thought there was every reason to believe that associations such as the I.M E.A. would still carry on, although perhaps in another form and perhaps under some other name. If those who were in power began to scrap the associations and methods under which the electrical industry had been run in the past they would in his view be making a serious mistake.

To the general public the most important thing under nationalization would be tariffs. It would be quite easy to develop the supply of electricity in rural and urban areas by increasing the tariffs in the more industrial areas but in his opinion that would be a wrong policy. He suggested that the best way of tackling the job was to develop those areas so as to enable them to reduce their own tariffs.

Reviewing the events of the past year Mr. Ellison said that they had brought the controversy with the power companies for a determination under Section 12 of the Electricity Supply Act of 1926 to a successful conclusion by what was known as the Ilkley test case. At their meetings that morning they had come to decisions which he thought would result in their getting their dues and demands from the power companies in the speediest way.

After the loyal toast the chairman of the Council (Mr. W. H. Cooper) extended a civic welcome to the guests. Although not a large one, the Spenborough electricity undertaking was very efficient, he said. Replying to the welcome Mr. O. G. Cook (Bingley), vice-chairman of the Centre, referred to the work which the Association had done for the smaller authorities. He hoped that Mr. Shinwell would at any rate consider the claims of local authorities to have representation on the Central Authority.

Reports on German Industry

Recent reports on German industry, obtainable from H.M. Stationery Office, include the following:—B.I.O.S. 1341. "Electric Cable, Wire Insulating and Braiding Machinery Industry" (5s.). F.I.A.T. 966. "Recent Developments in the Design of Kaplan and Francis Turbines" (5s.).

Deferment of Call-up

Technical Education and Training

BY virtue of a new edition of leaflet N.L. 11 of the Ministry of Labour and National Service, deferment of call-up beyond the age of eighteen may be granted to students of engineering to enable them to complete a course of professional training of not more than five years, which may involve any combination of technical education and practical training. Its terms include student apprentices who obtain their training wholly by employment combined with concurrent part-time study, provided that their apprenticeship began before their seventeenth birthday or within three months of the end of their whole-time general education; that their practical engineering training reaches a high standard; that their course of study leads to an engineering degree, an engineering higher national certificate, associate membership of the Institutions of Civil, Mechanical or Electrical Engineers or its equivalent in certain other institutions; that they are allowed time off in working hours of not less than eight hours a week, on average, throughout the period for attending part-time classes and/or for study in preparation for one of the above qualifications.

Craft or trade apprentices who wish to transfer to student apprenticeship may do so up to their nineteenth birthday or, in special cases, up to their twenty-first birthday, but deferment will not extend beyond the termination of the new apprenticeship or the twenty-fourth birthday, whichever is the earlier. Apprentices who wish to transfer from apprenticeship to a full-time course of study of university standard may do so up to their twenty-first birthday or immediately after the termination of their apprenticeship, whichever is the earlier.

Students pursuing practical training prior to full-time university courses may be granted deferment in respect of this practical training provided that they satisfy the Ministry of their intention to take a full-time course and that in the interim they are receiving effective practical engineering training of a suitably high standard which began before their eighteenth birthday or within three months of the expiration of any deferment to enable them to remain at school after that age. Following satisfactory progress in practical training further deferment will be allowed for a full-time course if the student can secure a place at a university or technical college.

Students undergoing practical training who undertake a full-time course of study covering three terms (or in some cases six months) a year for an engineering qualification of the approved standard and who are required to continue their practical training in the employer's establishment during vacations, will be eligible for deferment on similar conditions. They will be regarded as essentially students throughout the complete course of study concerned. Students taking a full-time course of study for a university degree or diploma, a higher national diploma or other qualification of not lower standard before practical training will be eligible for deferment provided they begin the course before their eighteenth birthday or within three months of the expiration of any deferment enabling them to remain at school until the end of the summer term. On successful completion of the course, they may be granted deferment for not more than two years for practical training.

The Unit of Light

"New Candle" Basis

AS from January 1st, 1948, the National Physical Laboratory will express all photometric values in terms of units based on the "new candle." This unit of luminous intensity is of such a magnitude that the brightness of a full (or cavity) radiator (black body) at the temperature of solidification of platinum is 60 new candles per sq cm.

The "new lumen" is the luminous flux radiated within unit solid angle by a uniform source having a luminous intensity of one new candle. The new unit of illumination will be one new lumen per unit area. One new lumen per sq ft will also be called one new foot-candle and one new lumen per sq metre one new lux. The new unit of brightness will be one new candle per unit area, and, alternatively, one new foot-lambert. The latter unit is defined as the brightness of a perfectly diffusing surface of 100 per cent reflection factor when its illumination is one new lumen per sq ft. This decision follows one made by the International Commission on Weights and Measures.

When differences of colour are involved in the determination of any magnitude in terms of the above units, the evaluation will be in accordance with that which would be obtained by an observer having the relative luminosity curve (curve connecting eye sensitivity with wavelength) adopted by the International Commission on Illumination in 1924 and later by the International Committee of Weights and Measures.

Tube Investments Youth Camp

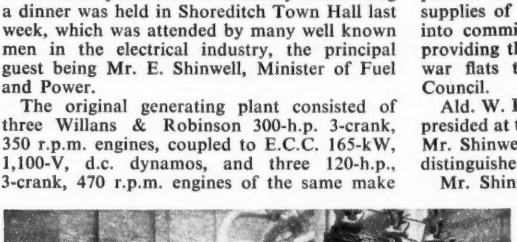
Upwards of 300 youths from Tube Investments engineering companies in different parts of the country will holiday together at a former R.A.F. aerodrome. By arrangement with the Air Ministry, part of the former R.A.F. Station at Halfpenny Green, between Stourbridge (Worcs.) and Bridgnorth (Shropshire) will house from July 28th for a week the companies' annual youth camp, organized under the welfare scheme for young entrants into industry. The cost to the youths taking part will be nominal and special sports programmes are being arranged.

Shoreditch Jubilee

Minister of Fuel and Power at Celebration Dinner

ON June 28th, 1897, the combined electricity generating station and refuse destructor works of the Shoreditch Borough Council at Coronet Street were opened by Lord Kelvin. To mark the jubilee of the electricity undertaking a dinner was held in Shoreditch Town Hall last week, which was attended by many well known men in the electrical industry, the principal guest being Mr. E. Shinwell, Minister of Fuel and Power.

The original generating plant consisted of three Willans & Robinson 300-h.p. 3-crank, 350 r.p.m. engines, coupled to E.C.C. 165-kW, 1,100-V, d.c. dynamos, and three 120-h.p., 3-crank, 470 r.p.m. engines of the same make coupled to 70-kW, 165-V, d.c. dynamos. In the first nine months the electricity undertaking sold a total of 284,295 kWh, the maximum demand was 408 kW and the number of consumers was 151. The first borough electrical engineer, Mr. C. Newton Russell, was succeeded in 1925 by Mr. W. Weekes, Mr. P. C. Ebner became "chief" in 1937, on Mr. Weekes' retirement, and Mr. R. H. Rawll, the present borough electrical engineer, followed Mr. Ebner in 1946.



The original Willans & Robinson engines and E.C.C. generators installed at Coronet Street, Shoreditch

With the increasing demand for electricity a further power station was opened at Whiston Street, and in 1919 the Coronet Street station ceased to generate and became the main distributing centre. The Evelyn Street substation equipped with Hewittic glass bulb mercury-arc rectifiers, opened in 1928, ranked as the largest glass bulb rectifier substation in the world. The capacity of the Whiston Street station was increased in 1928 to 24,500 kW and in 1934 it became a selected station.

Damage from bombing in the borough during the war resulted in a considerable drop in electricity consumption, but the demand has again risen and for 1946-47 the sales amounted to 34·6 million kWh with a maximum demand of 17,820 kW. The change-over from d.c. to a.c., held up by the war, is now being rapidly pushed forward. A new substation furnishing supplies of 415/240 V, 4-wire, 3-phase was put into commission in February this year and is providing the supply to the first block of post-war flats to be completed by the Borough Council.

Ald. W. H. Girling, the Mayor of Shoreditch, presided at the jubilee dinner, and in introducing Mr. Shinwell extended a welcome to the many distinguished visitors present.

Mr. Shinwell, in proposing the toast of the Shoreditch electricity undertaking, referred to compensation under the Electricity Bill, and said that so far as municipalities were concerned £5,000,000 had been provided. The Government could not possibly provide compensation to enable local authorities to reduce materially the rates in their particular areas. Next year, however, there would be a revision of the block grant, and what the municipalities might lose on the swings they might gain on the roundabouts.

Councillor W. Hebden (chairman of the Electricity Committee), in responding, reviewed the history of the undertaking and expressed the hope that when the electricity supply industry was nationalized Mr. Shinwell would give engineers as much scope as possible to express their own initiative.

The toast of the staff of the Electricity Department was proposed by Ald. J. Abrahams, who said that the prosperity of an electricity undertaking was largely due to the efficiency of the staff. Mr. R. H. Rawll, in reply, said that one of the main reasons for the success of the electricity supply industry was that no major industrial troubles had occurred, and he attributed this happy state of affairs to the excellent work of the Whitley Councils. The success of the Electricity Bill depended upon the engineers and he hoped the excellent spirit and traditions of the industry would continue.

In conjunction with the jubilee dinner an interesting exhibition was arranged at the Town Hall in which some of the earliest apparatus in use was shown side by side with modern equipment.

ELECTRICITY SUPPLY

Commissioners and Charges. Great Yarmouth Power Station Site.

Aldershot.—NO PRICE REDUCTION.—Details of proposed reductions in charges were recently submitted to the Electricity Commissioners, who wrote expressing difficulty in understanding the reasons for them in view of the results of the year's working. The proposed running charge of $\frac{9}{16}$d. under the domestic two-part tariff did not appear to be economic and they considered it doubtful whether the flat rate charge of $\frac{3}{4}$d. for domestic heating and cooking could be regarded as satisfactory. The Electricity Committee thereupon decided to recommend the Council to take no further action, an amendment in favour of persisting in the reductions being defeated. At the Council meeting Councillor B. W. Edgoose again moved his amendment, but the town clerk warned the Council that it would be on very dangerous ground and if the reductions were made they would have to come out of the rates. The amendment was defeated by thirteen votes to seven.

Barrow-in-Furness.—WATER POWER DEVELOPMENT.—The Corporation has arranged for Williamson & Partners, of Glasgow, to submit a preliminary report on the development of hydro-electric schemes in the Coniston, Leven, and Duddon areas.

Blackburn.—STREET LIGHTING.—Proposed relighting of parts of Preston New Road will cost £2,565.

Bradford.—STREET LIGHTING CONTROL.—The Corporation is to adapt its street lighting system for operation with ripple control gear, at an estimated cost of £4,750.

Gateshead. — STREET LIGHTING. — The first stage of the Town Council's street lighting plan is being sent to the Ministry of Transport for approval. This section of the work involves 82 lamps in the d.c. area to cost £8,121, and 140 lamps in the a.c. area to cost £7,434. Other charges will bring the cost up to £17,054 less a contribution of £888 from the North-Eastern Electric Supply Co., Ltd.

Great Yarmouth.—REVISED CHARGES.—Consumers benefit under a revised scale of charges now in force. The basic rates are raised slightly but compare favourably with the previous scale which was subject to a war increase of 33⅓ per cent. The new lighting flat rates, for example, are 4½d. in the borough and 6d. outside, compared with 4d. and 5½d. plus war increase. Other new charges include the following, with the superseded scale, subject to war increase, in parentheses:—Domestic "all-in" tariff, borough: fixed charge 10 per cent of rateable value (same) and 0·65d. per kWh (0·5d.); outside areas, 20 per cent of r.v. (15 per cent) and 0·85d. (0·75d.). For business premises the basis of the fixed charge has been somewhat altered: the "unit" charges are the same as under the domestic tariff. The industrial tariff is now based on consumption, ranging from 1d. per kWh for the first 4,000 kWh per month to 0·6d. over 32,000, subject to coal clause and with load factor and power factor qualification; previously there was a two-part tariff. A 5 per cent prompt payment discount applies to all quarterly accounts except special contracts.

SITE FOR POWER STATION.—In the opinion of the Central Electricity Board a new power station could be built on the South Denes. The Town Council has therefore decided to buy 19·25 acres on the Denes and make a compulsory purchase order to acquire a further 2·6 acres for this purpose, subject to the formal consent of the Board and the Electricity Commissioners.

Kingston-on-Thames.—A REDUCED DEFICIT.—The deficit of £3,464 on the operation of the Corporation electricity undertaking last year was much lower than expected, a deficit of £15,000 having been estimated. The better position was caused partly by a rate reduction of £1,700. Owing to rising coal costs no hopes are held out of a profit during the current year.

Leicester.—CONTRIBUTION TO RATES.—Submitting the accounts of the Electricity Department to the City Council last week the chairman of the Electricity Committee (Alderman J. Minto) explained why they had brought into the balance sheet some of the reserve funds which enabled them now to produce a disposable surplus of £51,946. If the industry had not been brought to the verge of nationalization he would strenuously have opposed any of this surplus going to the relief of the rates. The Committee's recommendation was that the full amount legally allowed for the purpose, £20,708, should be applied in aid of the rate fund and the remainder carried forward. Referring to nationalization, Alderman Minto expressed disappointment with the restricted functions of the Consultative Councils. What their powers and duties would be had not been clearly defined, he said, but their duties were not going to be very onerous.

Llanfairfechan.—CHARGES TO BE REDUCED.—The Urban District Council is to use the net surplus of the undertaking to reduce charges.

Newcastle-on-Tyne.—STREET LIGHTING.—The City Council has applied for sanction to borrow £9,694 for improving the lighting on bus routes and £14,925 for lighting on housing estates.

Oswestry.—20 PER CENT REBATE.—Besides discontinuing all meter rents on quarterly accounts as from April 1st the Council has decided to give consumers a special rebate of 20 per cent for the June quarter (general quarterly accounts).

Scotland.—PRIVATE POWER SCHEME.—Over 100 families in the three neighbouring hamlets of Newe, Bellabeg, and Roughpark, and farms on the Candacraig estate, Glen of Strathdon, will have light and power before the end of the year from the hydro-electric plant provided by Mr. A. L. P. F. Wallace, who is laird of about 20,000 acres. Two dams are being built across the River Don at Poldullie and Newe, Aberdeenshire. Lighting and a restricted quantity of power will be distributed on a 250-V a.c. system; the distribution line poles covering a distance of 5½ miles, to serve the hamlets have already been erected.

Skipton.—FURTHER CONCESSION.—The Urban District Council has decided, for the first quarter of the present financial year, to suspend the 10 per cent addition to electricity accounts which has been operative for some time. A 20 per cent rebate was made on charges for the previous quarter.

Stafford.—DEFICIT ON YEAR.—The electricity undertaking sustained a loss of £930 for the year ended March 31st last. Presenting this report to the Town Council, Coun. H. Joynes said that a reply was awaited from the Electricity Commissioners on proposals relating to charges, already approved by the Council.

Swindon.—SUPPLY TO ESTATES.—In connection with the supply of electricity to new housing estates the Corporation has approved the provision of an additional h.v. feeder from Moredon power station to the Rodbourn Cheney substation.

York.—HIGH-VOLTAGE SYSTEM.—The Corporation is recommended to proceed with the second stage of its 33-kV scheme. This stage provides for the construction of a 33/11-kV substation of 20,000 kVA capacity at South Bank, and the estimated cost is £104,807 including £15,972 for buildings, £79,270 for plant and £9,250 for mains.

Overseas

Algeria.—NATIONALIZATION OF SUPPLY.—Under a new decree the French Government, in accordance with the law of April, 1946, has just announced that all the electric power supply undertakings in Algeria, like those in France, are to be nationalized and operated under the direction of a new body known as Electricité et Gaz d'Algérie.

Croatia.—RECONSTRUCTION PROGRAMME.—A five-year plan of reconstruction being debated by the Economic and Financial Committee of the Croatian National Assembly, provides for large-scale industrialization and electrification.

Birmingham's Record Year

Revenue Exceeds £5,000,000

FOR the first time in its history the Birmingham Electric Supply Department generated more than 2,000 million kWh in the year ended March 31st last and the undertaking's gross revenue exceeded £5,000,000. Once again the Committee, in its report submitted to the July meeting of the Council, is able to record no increase in basic tariffs despite rising costs; there was in fact a slight reduction in the average price per kWh sold compared with the previous year (from 0·950d. to 0·938d.). How great has been the rise in the cost of coal in recent years is shown by a note in the report that in 1935-36 only £743,088 would have been paid for the fuel that last year cost £2,813,480.

The undertaking, of which Mr. F. W. Lawton is chief engineer and manager, last year sold 1,298·2 million kWh, an increase of 131·4 million on the previous year. Apart from public lighting every class of supply shared in the increase, notwithstanding the fortnight's industrial shut-down last February. Consumption under the domestic contract tariff rose by no less than 92 million kWh, or 42 per cent. The number of consumers at the end of the year was 323,770, compared with 311,046 a year before. Electricity generated totalled 2,074·2 million kWh (against 1,882·6 million), the maximum demand being 504,700 kW (487,600 kW).

Work on the generating plant extensions at Hams Hall was handicapped by the severe winter weather which brought building operations to a standstill for nearly three months. The Department is, however, making strenuous efforts to ensure that two additional 50,000-kW sets are brought into use before next winter's peak load.

Capital raised to date for the purpose of the undertaking aggregates £25,733,912, of which £13,212,846 has been redeemed. During last year loan capital amounting to £1,300,000 was raised and £1,109,061 spent, mainly on extensions at Hams Hall "B" station. The year's gross revenue amounted to £5,167,756 (against £4,691,589), and working expenditure totalled £4,448,978 (£3,949,815), including £13,697 spent during the year on the change-over from d.c. to a.c. After meeting capital charges the surplus on the year's working was £217,999 to which is added a balance of £505,533 brought forward from the previous year. A sum of £227,275 has been applied to capital items and £496,257 is carried forward. There have been no contributions to the rates since 1929-30.

Civil Engineers' Conversazione

The first post-war Conversazione of the Institution of Civil Engineers was held on July 10th, and included an exhibition of engineering models and scientific apparatus.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

W. T. Henley's Telegraph Works Co., Ltd.—Presiding at the annual meeting held on July 11th Sir Montague Hughman (chairman) said that there had been a substantial increase in turnover during the year under review, some of which was accounted for by the rise in the cost of materials, but undoubtedly they had seen signs of recovery. They had many problems to face and the setback during the winter weeks, when they were closed down for want of fuel, power and light, was one of the most disastrous and unpleasant occurrences in his lifetime.

Their exports overseas amounted to over 36 per cent of their total business, as compared with 27 per cent for 1945. They were very much interested in the distribution side of the electricity supply industry, and the nationalization of the industry might have far-reaching effects, as they might have one authority and one buyer for the bulk of their home production. There was a growing tendency in British possessions and foreign countries to develop the cable industry, and they must face the fact that they would have local competition and possible restrictions on the imports of their products in the future.

Their business in India was extensive, and the course of political troubles in that country during 1946 caused them a great deal of anxiety. In Australia and New Zealand their business continued to expand, although conditions were such that the import of some of their products tended to be restricted. The same remarks applied to their South African company which also had a successful year. Their business in other parts of the world had increased and there was a large demand which they had only been able to meet to a comparatively small extent owing to shortages of all kinds.

Thomas de la Rue & Co., Ltd., report a profit for the year ended March 29th last of £423,952, as compared with £452,570 for the preceding year. Reserve receives £50,000 and it is proposed to pay a final ordinary dividend of 40 per cent (against 35 per cent), making 50 per cent for the year (against 45 per cent). The balance carried forward is £134,149 (£88,192).

Walsall Conduits, Ltd., report a net profit for 1946, before tax, of £230,707, as compared with £127,721 for 1945. Taxation requires £111,543, general reserve receives £20,000, and as we have already reported, the final ordinary dividend is 35 per cent, plus a bonus of 15 per cent, making 70 per cent for the year (against 55 per cent). The balance carried forward is £142,032 (against £105,993 brought in). In his statement issued with the report, Mr. A. E. Read (chairman) says that the increase in profit is largely due to sales expansion, the turnover for 1946 being the highest in the history of the company. A new annealing plant, the first of its kind in this country, has been installed in the foundry, and is now in full production. The company has recently acquired the business of A. G. Hackney, Stoke-on-Trent, to improve the supplies of ceramics, and this company is now a wholly owned subsidiary.

Pye (Ireland), Ltd.—Speaking at the annual general meeting held in Dublin, Mr. C. O. Stanley, who presided, said that the increase in trading profit was entirely due to the very large increase in production. It was proposed in the new trading year to offer a wireless set at a price which would bring it within the purchasing power of a section of the public which had not been able to afford radio up to now. The manufacture of radio-gramophones would start in the early autumn.

J. Stone & Co., Ltd., report that, after providing for income tax and including £220,000 (£280,000) E.P.T. recoverable, the net profit for 1946 was £242,828 (£228,155). A sum of £50,000 is again placed to reserve and the dividend is maintained at 25 per cent. The carry-forward is increased from £342,715 to £346,443. The consolidated balance sheet shows current assets £2,592,000 and liabilities of £1,392,000.

The British Aluminium Co., Ltd., is to repay its outstanding £3,135,559 4 per cent mortgage debenture stock at 104 per cent on December 31st and to issue £3,500,000 new 3 per cent mortgage debentures at 100½ per cent. Existing stockholders are to be invited to convert into the new stock and those who do so will receive on January 1st a full six months' interest, with a cash payment of £3 10s. per cent.

Franco Signs, Ltd.—At the annual general meeting Mr. J. F. Mallabar, chairman, said that even if the lighting restrictions were removed at an early date difficulties in obtaining raw materials would restrict the company's production of illuminated signs. Considerable progress had been made with building up a business in the manufacture of glassware for medical and pharmaceutical purposes.

Richardsons Westgarth & Co., Ltd., report a net profit for the year ended March 31st last of £127,419, as compared with £87,333 for 1945-46. The dividend for the year is 10 per cent, and compares with a dividend of 8 per cent and a bonus of 4 per cent in the previous year.

The Harland Engineering Co., Ltd., reports a net profit for 1946 of £15,990, as compared with £17,296 for 1945, to which is added £16,002 brought in, making £31,992. The ordinary dividend, paid on increased capital, is maintained at 7 per cent and the balance carried forward is £18,028.

Lightfoot Refrigeration Co., Ltd.—Speaking at the annual general meeting Mr. F. Ryder, chairman, said that, apart from the tremendous task of changing over from war to normal production, the company had suffered a serious setback from the fire which occurred last September. To avoid a recurrence of the anxieties suffered during the fuel crisis early this year, an oil-engine driven generating set was being installed as a standby.

The Isle of Thanet Electric Supply Co., Ltd., has sent a circular to shareholders regretting the delay in presenting the accounts for the year ended December 31st, due to a revision of the rating assessment which is expected to be available in August. Subject to adjustment of local rates the revenue amounted to £173,052 (£108,635), the profit being £49,844 (£28,929).

The Rheostatic Co., Ltd.—Mr. L. Satchwell, chairman, stated at the annual general meeting that output, especially of thermostats, had reached a new peak in the company's history. Building work on the badly needed factory extension was well in hand.

The Electric Construction Co., Ltd., is to pay a dividend of 12½ per cent (same) for the past year, when the net profit was £58,320 (£89,990).

The Telegraph Construction & Maintenance Co., Ltd., is again paying an interim dividend of 5 per cent.

The Bristol Tramways & Carriage Co., Ltd., is to pay an interim dividend of 5 per cent, tax free (5 per cent, less tax).

New Companies

S.S. Electronics, Ltd.—Registered June 5th. Capital, £2,000. To acquire the business of an electronics engineer carried on by G. H. Sorrell at 61, Woodhill Crescent, Kenton, as G. Howard Sorrell. Directors: G. H. Sorrell and L. E. Simmonds. Regd. office: 8a, Byron Road, Harrow, Middlesex.

P. & D. Cramb, Ltd.—Registered June 4th. Capital, £1,000. Electrical engineers and contractors, etc. Directors: P. D. Cramb and Mrs. Olive M. Cramb. Regd. office: Midland Bank Chambers, 91-93, High Road, N.W.10.

Dudley's (of Orpington), Ltd.—Registered June 6th. Capital, £2,000. To acquire the business of electrical engineers and dealers carried on by W. C. Dudley and G. Dudley at Orpington as Dudley's (of Orpington). Directors: W. C. Dudley and G. Dudley. Regd. office: 22, Carlton Parade, Orpington, Kent.

Grant Electric Co., Ltd.—Registered June 9th. Capital, £2,000. Directors: A. E. Robinson, R. A. Patterson and G. D. Grove. Regd. office: 3, Grant Road, Addiscombe, Surrey.

Robinson & Hands Machinery, Ltd.—Registered June 12th. Capital, £500. To acquire the business of manufacturers and wholesale distributors of electrical goods carried on at 54-56, Barwick Street, Birmingham, by Durant & Willitts, Ltd., as the Robinson & Hands Electric Co., and to carry on business of electrical and general engineers, etc. Directors: F. L. Willitts and O. J. Bickley. Regd. office: 54-56, Barwick Street, Birmingham, 3.

W.P. Electrical Co., Ltd.—Registered June 11th. Capital, £1,000. Directors: S. R. Peel and C. Wilkinson. Regd. office: 2, Scoresby Street, Bradford.

Lewis & Rees (Llanelly), Ltd.—Registered June 12th. Capital, £2,000. Electricians, wiring contractors, etc. Directors: O. E. Lewis, Mrs. Elvira Lewis, J. T. Rees and Mrs. L. Rees. Regd. office: Albion House, Water Street, Llanelly.

Allenbridge Electric, Ltd.—Registered June 14th. Capital, £5,000. Electricians, electrical and radio engineers, etc. Directors: R. N. Rodway and G. C. Swain. Regd. office: 34, East Street, Wimborne, Dorset.

Liquidations

Frank Murphy of London, Ltd., 15, Sun Street, Hitchin, Herts.—The statutory meeting of creditors was held on July 11th, at the London Bankruptcy Court, when resolutions were passed for the appointment of Mr. L. S. Findlay, of Poppleton & Appleby, F.C.A.,4, Charterhouse Square, London, E.C.1, as liquidator, with a committee of inspection. The Official Receiver reported that it was understood that the liabilities to creditors amounted to £24,648, whilst the issued capital was £48,936. The total liabilities were therefore £73,584, while the assets were put down at £18,299, leaving a deficiency so far as shareholders were concerned of £55,285. Of the liabilities to creditors approximately £4,160 was preferential and the assets were at the premises of the company at Liverpool, Hitchin, and Nottingham.

Stevens Wholesale (Hounslow), Ltd.—At the statutory meeting of the creditors held recently in London a statement of affairs was submitted which disclosed that the ranking liabilities amounted to £5,908, of which £5,427 was due to unsecured trade creditors. The assets were estimated to produce £1,796, and after deducting £86 for preferential claims, there was a deficiency so far as the creditors were concerned of £4,198. It was decided to confirm the voluntary liquidation of the company with Mr. L. S. Findlay, F.C.A., of Poppleton & Appleby, 4, Charterhouse Square, London, E.C.1, as liquidator. A committee of inspection was also appointed.

Glenmill Radio & Electrical Co., Ltd.—Winding up voluntarily. Liquidator, Mr. W. Walker, 185-188, High Holborn, London, W.C.1.

Bankruptcies

A. V. Richardson, residing at 5, Grantham Road, Bradford, radio and electrical engineer, and carrying on business at 126, Manningham Lane, Bradford, as Market Radio & Electrical Supplies.—Receiving order made July 7th on debtor's own petition.

STOCKS AND SHARES

WHILE the outlook for the coming winter—physical and financial—is painted in darker colours by every Government speaker who treats the subject, Stock Exchange markets refuse to remain depressed for more than a few days at the most. Any fall that occurs in prices serves to bring in fresh support. Money is plentiful and insists upon finding sources of employment. The spate of new issues shows little sign of contraction. Next month, as already mentioned, the stamp duty on transfers rises from its present 1 per cent to 2 per cent, and this will make an addition to expenses of dealing in stocks and shares which, possibly though improbably, may give pause to the purchase of securities which attract stamp duty. Prices, however, show a general firmness and business is active.

Electricity Supply

Opposition continues to be directed against the passage of the Electricity Bill. The effect, from the Stock Exchange point of view, is to maintain prices at the slightly reduced levels to which they fell a month ago. The Bill, was so hastily drafted that it has provoked numbers of amendments, the result being that, so far as can be seen at present, months will elapse before it reaches the Statute Book. The interim dividends are coming along, the first batch being due in September, following which it is thought that the final dividends for the current twelve months will be declared, and paid at the usual rates, in the early spring of 1948. Within the past few business days declines of about 6d. have occurred in prices of preference shares of certain Home electricity supply companies.

Transport Stocks

A recovery of prices in the market for Home railway stocks is attributed to the anxiety of buyers to acquire stock before they have to pay the higher transfer duty, which will be doubled from August 1st. Prices remain, nevertheless, at substantial discounts below the figures at which the stocks are to be taken over next January. Allowing for all expenses, it is calculated that a current buyer is in effect acquiring the Government stock at a price equivalent to 95 or less.

The Week's Changes

British Insulated Cables, at 45s., and Siemens, at 36s., show modest improvement over the past week: but Johnson & Phillips at 78s. 9d. are 1s. 3d. lower and, on balance, the electrical equipment market shows few changes of any significance. In the engineering group, Tube Investments have jumped 10s. to 7¼, and Murex have improved to 96s. 3d. Associated British Engineering, on the other hand, are 5s. down at 47s. 6d. De La Rues show a net improvement of half-a-crown, to 65s., despite a reaction on the declaration of the 50 per cent dividend. Cable & Wireless stocks are better, with the ordinary at 162½ and the preference at 119½. Associated Electrical Industries are 1s. 6d. higher at 93s. 6d.

Walsall Conduits Dividend

Walsall Conduits 4s. shares have been a conspicuously good feature in the electrical equipment market. After firming up to 60s. in anticipation of a good dividend statement, the price further advanced to 63s. upon the declaration of a 15 per cent bonus in addition to the maintenance of the final dividend at 35 per cent. With the interim of 20 per cent the distribution for 1946 totals 70 per cent. On this basis, the yield works out at £4 9s. per cent. An expansion of profits from £128,000 to £231,000 indicates that the larger distribution involves no departure from the consistently conservative character of the company's dividend policy. Up to now, 55 per cent has been paid regularly since the registration of the company in 1936, out of earnings which have averaged about 90 per cent on the £150,000 ordinary capital.

Miscellaneous Matters

Publication of the full accounts of Chloride Electrical Storage shows the 20 per cent dividend to be covered by earnings equal to more than double that rate on the ordinary capital. A further £100,000 has been added to the general reserve, bringing the total up to £900,000. The shares, at 5½, have added another 1s. 3d. this week to previous advances. A. C. Cossor are better at 27s. upon repetition of the dividend of 25 per cent. Oriental Telephone & Electric accounts for 1946 have been postponed by the delay in the receipt of the audited returns from Singapore. Eastern Telegraph preference has been showing signs of recovery on the view that the question of liquidation will be revived after the acquisition of Cable & Wireless has been completed. The price has risen 6 points to 121. Lists opened on Thursday this week for an issue of five million pounds of 2½ per cents at 100 in North of Scotland Electricity stock. The terms look expensive, matched against comparable securities.

Hoovers

In raising the interim dividend for the year ending next December from 5 to 10 per cent, Hoovers have explained that the intention is to equalize the dividend payments. Shareholders are advised not to draw inferences in relation to the year's total distribution. Nevertheless, the 5s. shares have hardened 1s. to 52s. 9d. For 1946 there was a final of 25 and bonus of 10 per cent. The shares would return £3 15s. 9d. per cent on last year's total of 40 per cent. British Vacuum Cleaners, makers of the "Goblin" products, at 22s., show a yield of 4½ per cent on the dividend lately maintained at 20 per cent. Profits for the year to last September are stated to be virtually unchanged at £45,000.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Infra-red Lamp

A NEW heating lamp for drying and baking by infra-red rays is being produced by the BRITISH THOMSON-HOUSTON CO., LTD., 9, Langley Road, Watford, Herts. It is of 250 W with a glass bulb of parabolic shape and a satin frosted crown. The lower half of the inside surface of the bulb is silvered to form an internal reflector which concentrates the rays, and the lamp is fitted with a mechanically attached (non-cemented) cap to enable it to withstand the heat in an oven.

Internally silvered "Mazda" infra-red lamp

This "Mazda" bulb enables any form of external reflector to be dispensed with. The contour of the internal reflector is such that the beam is given a spread of not more than 120 degrees and, by suitable spacing, it is easy to arrange a bank of fittings so that the resultant energy field is evenly spread within narrow limits. Lamps can also be mounted much closer together, since there are no external reflectors to be accommodated and this, in turn, permits a higher degree of concentration when desirable. The new lamp is considerably lighter than a combination of lamp and external reflector for portable, or transportable, banks to bake relatively small areas of paintwork.

Busbar assemblies designed for the new lamps can be arranged to form contours suitable for the various applications of infra-red baking and drying.

Fluorescent Fitting

A vitreous enamelled reflector for two 5-ft fluorescent lamps has been introduced by the

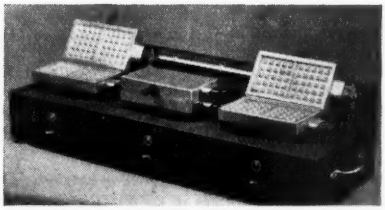
Twin lamp "Flurolier" reflector fitting

BENJAMIN ELECTRIC, LTD., Tariff Road, Tottenham, London, N. 17. It is known as the "Flurolier" and is detachable for maintenance, complete with lamps. It is finished in "Crysteel" porcelain enamel and fixed by simple acting fasteners. During erection the fitting can be lifted straight up on to the suspensions and its weight has not to be supported for fixing or wiring. The control gear is easily accessible from the top and starter switches can be exposed by sliding the cover sideways. It is normally supplied fitted with auxiliaries and ready wired for a twin lamp circuit.

Caterers' Waffle Cooker

A six-portion waffle cooker intended for cafés and catering establishments is being made by the COOPER MANUFACTURING CO., 17, Hanway Street, London, W.1. It consists of three separate heating moulds, each designed for making two rectangular waffles and loaded to 900 W per section, totalling 2·7 kW, standing upon a common base with a separate switch and pilot lamp for each section.

Models for 200/250 V as well as 100/110 V are available, constructed of aluminium throughout and either polished or anodized. The connector sockets are mounted in mica and



Multiple waffle cooker for catering establishments

deeply shrouded, earthing clips being provided. The hinged platens, which contain nickel-chrome tape elements supported on mica, are removable for servicing at the makers' works.

Brazilian Imports

STATISTICS of Brazilian foreign trade have been published in Rio de Janeiro covering January to September, 1946. It appears that imports into Brazil of radio apparatus, radio-gramophones and accessories in this period amounted in value to Cr.$105,000,000, compared with Cr.$21,000,000 in the corresponding months of 1945; telephone and telegraph receivers to Cr.$44,000,000 (as compared with Cr.$11,000,000); generators and motors to Cr.$83,000,000 (against Crs.$32,000,000) and other electrical apparatus and electro-technical articles to Cr.$251,000,000 (as compared with Cr.$113,000,000). (£1 = about 75 Cruzeiros.)

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.*2.

1941

GENERAL Electric Co., Ltd., and C. A. Maer.—" Braking apparatus for winder and like systems." 5605. April 30th, 1941. (589591.)

General Electric Co., Ltd., C. E. Ransley, J. W. Ryde and S. V. Williams.—" Crystal contacts of which one element is silicon." 6854. May 28th, 1941. (Cognate applications 9109/41 and 10623/41.) (589592.)

Metropolitan-Vickers Electrical Co., Ltd., H. Constant and W. Merchant.—" Axial flow turbines, compressors, and the like." 12272. (September 22nd, 1941. (589541.)

Metropolitan-Vickers Electrical Co., Ltd., K. Baumann and H. Constant.—" Internal-combustion turbines." 12273. September 22nd, 1941. (589542.)

Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz.—" Radio obstacle detectors." 14941. March 8th, 1940. (589593.)

1942

Holding Intercito.—" Apparatus for feeding electrode rods." 584. January 15th, 1941. (589543.)

M-O Valve Co., Ltd., and J. A. Smyth.—" Manufacture of electrical discharge devices." 8679. June 24th, 1942. (589545.)

1943

Landis & Gyr Soc. Anon.—" Remote control installations." 3951. March 16th, 1942. (589595.)

British Thomson-Houston Co., Ltd.—" Synthetic resinous condensation products." 7872. May 23rd, 1942. (589695.)

1944

Sperry Gyroscope Co., Inc.—" Velocity modulation electron discharge device." 988. January 22nd, 1943. (589696.)

A. Reyrolle & Co., Ltd., and A. T. Robertson.—" Control systems for electric power transmission systems employing synchronous alternating current dynamo-electric machines." 1368. January 25th, 1944. (589749.)

Landis & Gyr Soc. Anon.—" Prepayment mechanisms for meters." 5407. May 1st, 1943. (589598.)

Plessey Co., Ltd., and C. D. H. Webb.—" Electrical plug and socket connection." 5785. March 29th, 1944. (589697.)

Allmanna Svenska Elektriska Aktiebolaget.—" Knitting-machines." 9248. May 27th, 1943. (589646.)

G. R. Shepherd (Westinghouse Electrical International Co.).—" Heat treatment of silicon-iron alloys to reduce magnetostriction." 9493. May 17th, 1944. (589551.)

Dictaphone Corporation.—" Circuit control device designed for a dictating machine." 13406. July 27th, 1943. (589553.)

Western Electric Co., Inc.—" Directional antenna." 13547. July 27th, 1943. (589603.)

D. G. Reid and C. C. Cradwick.—" Pulse-operated thermionic valve circuits." 13951. July 20th, 1944. (589606.)

H. G. Richardson.—" Magnetic separators." 17315. September 11th, 1944. (589558.)

Telefonaktiebolaget L. M. Ericsson.—" Workmen's time recording apparatus." 17507. September 1st, 1943. (589653.)

A. C. King and D. J. Battersby.—" Electric terminals and cable connectors." 1085. September 22nd, 1944. (589656.)

Hazeltine Corporation.—" System for space-scanning with a radiated wave-signal beam." 18414. October 27th, 1943. (589607.)

Hazeltine Corporation.—" Radiated-signal receiving system." 18415. October 27th, 1943. (589608.)

Hazeltine Corporation.—" System for locating a radiated-signal reflector." 18416. October 27th, 1943. (589609.)

Western Electric Co., Inc.—" Piezo-electric crystal arrangements." 20103. October 21st, 1943. (589659.)

W. H. Sykes.—" Electrically controlled governors for turbo-alternators and like machinery." 21291. October 31st, 1944. (589613.)

Pyrene Co., Ltd.—" Electrodeposition of iron-nickel alloys." 24074. December 2nd, 1943. (589561.)

P.R.T. Laboratories, Ltd., J. C. L. Rowe, G. H. Leonard and B. J. Solley.—" Frequency determining arrangements." 26034. December 28th, 1944. (Cognate application 31790/45.) (589562.)

1945

Westinghouse Brake & Signal Co., Ltd., and S. A. Stevens.—" Automatic circuit closing devices for series electric circuits." 488. January 5th, 1945. (589563.)

M-O Valve Co., Ltd., and J. A. Smyth.—" Electrical discharge devices and holders or sockets therefor." 1166. January 15th, 1945. (589671.)

A. West & Co., Ltd., and C. Johnson.—" Variable resistance devices." 2012. January 25th, 1945. (589626.)

Unity Heating, Ltd., and W. Ohr.—" Low temperature electrically heated prefabricated building components." 2037. January 25th, 1945. (589752.)

J. Ratcliffe.—" Electric fires." 2525. February 1st, 1945. (589569.)

Sangamo Weston, Ltd.—" Moving coil electrical measuring instruments." 2918. March 15th, 1944. (589570.)

General Electric Co., Ltd., and J. Cates.—" Circuits for electric-discharge lamps." 3694. February 14th, 1945. (589571.)

Allmanna Svenska Elektriska Aktiebolaget.—" Electrically semi-conducting coating and method of producing same." 4345. March 11th, 1944. (589574.)

F. G. Horstmann.—" Inspection lamps." 5439. March 5th, 1945. (589578.)

Standard Telephones & Cables, Ltd., and C. N. Smyth.—" Electron-discharge devices." 6446. March 14th, 1945. (589580.)

Telegraph Condenser Co., Ltd., P. A. Sporing and C. P. Johnson.—" Means for depositing films of metal on a series of plates or sheets." 6488. March 15th, 1945. (Cognate application 2081/46.) (589581.)

Telegraph Condenser Co., Ltd., P. A. Sporing and C. P. Johnson.—" Control of paint-spraying apparatus." 6490. March 15th, 1945. (589582.)

Unity Heating, Ltd., and W. Ohr.—" Prefabricated wall constructions." 6583. March 15th, 1945. (589754.)

British Thomson-Houston Co., Ltd.—" Electric telemetering systems." 7137. March 22nd, 1944. (589584.)

A. A. Barber, G. C. Goodman and S. R. Richardson.—" Apparatus for generating infra-red and ultra-violet rays." 7494. March 24th, 1945. (589755.)

British Thomson-Houston Co., Ltd.—" Centrifugal compressors." 7664. March 31st, 1944. (589689.)

United-Carr Fastener Corporation.—" Cable clamps and the like." 7685. April 29th, 1944. (589690.)

Escher Wyss Maschinenfabriken Akt.-Ges.—" Shaft glands for steam and gas turbines working at high temperatures." 7699. March 28th, 1944. (589706.)

Maschinenfabrik Oerlikon.—" Current transformers." 7762. April 22nd, 1944. (Cognate application 7763/45.) (589713.)

F. B. Dehn (R. Hetherington & Son, Inc.).—" Snap-action electric switches." 7848. March 28th, 1945. (589721.)

J. E. Dyson and J. Delaney.—" Electric meters." 7853. March 28th, 1945. (589723.)

Siemens Bros. & Co., Ltd., and D. P. Long.—" Electric selective systems." 7866. March 28th, 1945. (589726.)

A. H. Hunt, Ltd., and F. O. Booth.—" Electrical capacitors." 7876. March 28th, 1945. (589728.)

Warner Electric Brake Manufacturing Co.—" Magnetic friction elements for brakes and like friction devices." 7972. April 15th, 1944. (589737.)

Ericsson Telephones, Ltd., and D. C. Crowe.—" Electro-mechanical calculating apparatus." 8186. April 3rd, 1945. (589764.)

Carr Fastener Co., Ltd., and G. Wagstaff.—" Electrical terminal tags and terminal strips or other supports for insulating material carrying a series of such tags." 8191. April 3rd, 1945. (589765.)

Metropolitan-Vickers Electrical Co., Ltd., E. L. N. Towle, A. Walsh and C. H. Last.—" Electric polyphase asynchronous motor equipments for power-operated hoists and the like." 8199. April 3rd, 1945. (589766.)

Lumalampen Aktiebolag.—" Fluorescent electric discharge tube." 8279. May 2nd, 1944. (589773.)

Igranic Electric Co., Ltd., and H. H. Rapley.—" Mechanism for separating newspapers or the like into counted batches." 8300. April 4th, 1945. (589776.)

Patelhold Patentverwertungs & Elektro-Holding, Akt.-Ges.—" Electrical signalling systems." 8339. April 4th, 1944. (589784.)

Plessey Co., Ltd.—" Inductive tuner." 8407. May 5th, 1944. (589787.)

Amended Specification

M-O Valve Co., Ltd., and others.—" Electrical resonators." 574934.

Meter Certification

ON October 1st next Defence Regulation 60CB (Suspension of Certification of Electricity Meters) will be revoked. The Electricity Commissioners state that all meters installed after that date, otherwise than by special agreement, must be certified and ordinary consumers will have a right to require a certified meter.

Undertakings which have not replaced uncertified meters installed since August 1st, 1943, or which are not yet in a position to recommence certification should consult the Meter Examiners. The latter will, is is expected, deal with all certificate requirements during periodical visits to undertakings, but urgent cases may still be dealt with by post, the undertaking keeping back for test a percentage of the meters submitted. Certification at meter manufacturers' stations will continue to be permissible for the time being.

Relaxations permitted in testing methods are withdrawn with the following exceptions. Special d.c. 12-in. voltmeters need not be included in the potentiometer equipment returned to the National Physical Laboratory. Electrolytic meters may be tested at any loading up to full load for a sufficient period to ascertain any errors at siphoning point or full- or half-scale reading or, for the non-siphoning type, at three-quarter scale. Repairs to standard potentiometers should not be carried out locally but defects should be reported to the Meter Examiners. Minor repairs to sub-standard indicating instruments may be carried out locally in the presence of a meter examiner. Standard clocks, stop watches and rotating sub-standards may also be repaired locally subject to permission for re-use after testing.

CONTRACT INFORMATION

Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Cambridgeshire.—July 25th. County Council. Electrical equipment for demonstration purposes in schools. (See this issue.)

Dundee.—August 13th. Corporation. Multicore h.v. and l.v. cables. (July 11th.)

East Ham.—July 31st. Electricity Department. Outdoor transformers. (See this issue.)

Halifax.—August 18th. Borough Council. 33-kV underground cables and 33-kV metalclad switchgear and control panels. (July 4th.)

Hornsey.—July 28th. Borough Council. Electrical installations in 116 flats, "Hillcrest," North Hill, Highgate. (July 4th.)

Kirkcaldy.—July 28th. Town Council. Electrical work at extensions to the Forth Park Maternity Hospital. W. Williamson & Hubbard, architects, Royal Bank Buildings.

Skelton and Brotton.—August 18th. Electricity Department. Two 3-phase static transformers. (See this issue.)

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Abergele.—Research laboratories, Ruabon, for Monsanto Chemicals, Ltd.; J. Gerrard & Sons, Ltd., builders, Swinton.

Aldridge.—Houses, Redhouse Lane (54) and Barns Lane, Rushall (36); T. H. Partridge, clerk, Council House.

Ashton-under-Lyne.—Houses (54), Crowhill estate, Littlemoss; J. Ridyard & Sons, Ltd., builders, Railway Saw Mills.

Bethesda.—Factory, for Bradite, Ltd.; R. T. Jones, architect, Bangor.

Biggleswade.—Factory, Henlow Camp, Bedford-Hitchin Road; Hendales, Ltd., Hitchin.

Boldon (Co. Durham).—Aluminium houses (100); surveyor, U.D.C. Offices.

Bullingdon.—Houses (60), Chinnor & Littlemoor; R.D.C. surveyor, Beaumont Street, Oxford.

Cheadle.—Extensions, children's homes; county architect, County Buildings, Stafford.

Chesterfield.—Houses (60), Wash House Farm site; W. S. Wilson, borough surveyor.

Consett.—Trading estate, Moorside, for North-Eastern Trading Estates, Ltd.; J. H. Knapper, architect, 52, Eldon Place, Newcastle-on-Tyne.

Houses (98), Richard Murray site; Stoddarts (Builders), Ltd., Rowlands Gill, Co., Durham.

Cumberland.—Additions to factories for Pierce & Co., Ltd., Maryport; Luxan, Ltd., and Cumbrian Tools, Ltd., Salterbeck; Marchon, Ltd., Kells; Brannan & Sons, Cleator Moor; Derma, Ltd., and Aiglon Creations, Ltd., Millom: Cumberland Development Co., Ltd., promoters, Whitehaven.

Darlington.—Additions to works, Smithfield Street, for the Cleveland Bridge & Engineering Co., Ltd.

Durham.—Additions, Chester-le-Street County School and R.C. boys' school, Prince Consort Road, Hebburn; county architect, 34, Old Elvet, Durham.

Essendon.—Primary school (£24,500); county architect, Castle Street, Hertford.

Gateshead-on-Tyne.—Extensions and alterations to four factories at the Team Valley Trading Estate; Gray & Kinghorn, architects, 52, Camden Street, North Shields.

Technical college; H. J. Cooke, chief architect, Municipal Buildings.

Gosforth.—Houses (32), near Rectory Grove; Cussins (Contractors), Ltd., builders, Gosforth.

Hartshill (Staffordshire).—Nurses' home and extensions, Orthopædic hospital; North Staffordshire Cripples' Aid Society.

Holmfirth.—Houses (90), Moorbottom and Moorlands sites; J. B. Brooke & Son, Ltd., builders, 264, Manchester Road, Huddersfield.

Hull.—Flats (66), Porter Street; Tarran Industries, Ltd., builders, Clough Road.

Ilkley.—Convalescent home; Batley and District Hospital Board, Carlinghow Hill, Batley.

Jarrow.—Factory for disabled persons on Trading Estate; C. S. Errington, 46, Grainger Street, Newcastle-on-Tyne.

Roman Catholic church school and social hall at Simonside; Rev. J. M. Conlon, St. Matthew's.

Houses (50) for T.C.

Leatherhead.—Extensions, Leatherhead Hospital; clerk to the Board of Management.

Ledbury.—Houses (50), Longacre estate; U.D.C. surveyor, The Deanery.

Longbenton.—Houses (72), Burradon; A. S. Sweetman, U.D.C. surveyor.

Macclesfield.—Extensions, Hurdsfield Mills, for Brocklehurst-Whiston Amalgamated; Howard & Souster, architects.

Mansfield.—Dairy, Southwell Road West, for Mansfield Co-operative Society; Vallance & Westwick, architects, White Hart Chambers.

Marske (North Riding).—Houses (32) for Saltburn-by-the-Sea U.D.C.; T. Grant, surveyor, U.D.C. Offices, Saltburn.

Middlesbrough. — Houses (104), Thorntree estate; borough engineer.

Milnthorpe.—County primary school; county architect, Exchange Chambers, Kendal.

Netherton.—Food factory for Home & Colonial Stores; H. J. Rowse, architect, Martins Bank Buildings, Water Street, Liverpool, 2.

Newbiggin (Northumberland).—Houses (350) for the U.D.C.; surveyor, Council Offices.

Newcastle-on-Tyne. — Additions, bottling factory, City Road, for McEwan & Co., Ltd.; Gordon Durham & Co., Ltd., builders, East Boldon.

Substation, Walker Naval Yard, for Vickers Armstrongs, Ltd.; R. T. James & Partners, engineers, St. Nicholas' Buildings.

Factory, Robson Street for the Buma Engineering Co., Ltd.; Thomas Armstrong, builder, Robson Street.

Rebuilding the Apollo Cinema; P. J. Steinlet, Causey House, Gosforth.

Newcastle (Staffs).—Engineering workshop, Chesterton Tileries, for G. H. Downing & Co., Ltd.; Wood, Goldstraw & Yorath, architects, Tunstall, Staffs.

Northumberland.—Houses (2,500), North Tynedale area; Forestry Commission.

Panteg.—Nurses' quarters and maternity blocks, County Hospital; C. L. Jones, County Architect's Department, Queen's Hill, Newport, Mon.

Penistone.—Houses (84), five sites, for R.D.C.; N. Heppenstall, architect, 39, Market Street, Milnsbridge, Huddersfield.

Putney.—Extensions to factory, Deodar Road, for Spalding Bros., Ltd.

Salisbury.—Houses (52), off Queen Alexandra Road, Bemerton Heath; city engineer, The Council House, Bourne Hill.

Seaham.—Additions to works for Crompton & Harrison, Ltd.

Sheffield.—Houses (26) and flats (28), Parson Cross estate extension, for T.C.; M. J. Gleeson, Ltd., builders, 822, Chesterfield Road.

South Shields.—Additions, Wright's Biscuit Factory; D. & J. Ranken, Ltd., builders, Stockton Road, Sunderland.

Houses (50); borough engineer.

Additions, Laygate Lane School; education architect, Town Hall.

Factory, Harton Dyeworks, Ltd.; Page, Son & Hill, architects, 75, King Street.

Nurses' home additions, General Hospital; John Reid, borough engineer.

Southgate.—Flats (52), Reservoir Road; borough engineer, Town Hall, Palmers Green, N.13.

Studley.—Works offices and canteen for Needle Industries, Ltd.; W. J. Whittall & Sons, Ltd., builders, 132, Lancaster Street, Birmingham.

Sunderland. — Factory for North-Eastern Estates, Ltd.; H. E. Pitt, Ltd., Leopold Street, Millfield.

Houses (64); R.D.C. surveyor.

Thame.—Extensions to works, High Street, for F. H. Castle & Co., Ltd.; Bailey & Walker, architects, 7, Victoria Street, London, S.W.1.

Tynemouth.—First part of new Robert Gardner School (£40,000); Anglo-Scottish Construction Co., Station Yard, Gosforth, Newcastle-on-Tyne.

Wallsend.—Furniture factory, printing works and a brush factory on new trading estate; Matkin & Hawkins, Barclays Bank Chambers, Sunderland.

Walsall.—Extensions to works, Pleck Road, for Walker Bros.

Extensions to factory, Willenhall Lane, Bloxwich, for H. Noble (Coopers), Ltd.

Trade Marks

APPLICATION has been made for the registration of the following trade marks. Objections may be entered within one month from July 9th:—

PROLITE (design). Class 6. No. 644,126. Extruded, rolled, pressed, swaged, drawn, fabricated or semi-fabricated tungsten and molybdenum and alloys thereof, none being goods included in other classes and all being goods for export.—Murex, Ltd., Ferry Lane, Rainham, Essex.

HAMCO. Class 9. No. 648,207. Electrical sound-reproducing apparatus and instruments, and component parts thereof not included in other classes and wireless apparatus.—Hampton Timber Co., Ltd., Castle House, High Street, Hampton, Middlesex.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

Jamaica.—A Kingston commission agent wishes to get into touch with British manufacturers or wholesalers of electrical household appliances. (X.185.)

New Zealand.—Manufacturers not already represented who are able to offer wires and cables for automobiles; also magnet and winding wires. (X.186.)